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THE SCOTTISH GEOGRAPHICAL MAGAZINE

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THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

ROCK-BORING ORGANISMS AS AGENTS IN COAST EROSION.

By Professor T. J. Jehu.

(*With Illustrations.*)

The burrowing of marine organisms into wood, sand, mud, shells, and stone has been familiar for a long time to the zoologist, but it has received hardly the attention it deserves from the geographer and the geologist. To the latter, the main interest of these borers has lain in the evidence which their perforations sometimes afford of changes in the relative levels of land and sea. In the well-known instance of the ruins of the Temple of Serapis at Pozzuoli, near Naples, marble pillars were found pierced at a height of twelve feet above ground with holes made by the marine bivalve *Lithodomus*, the date-shell—a form now living only below the level of high-water in the neighbouring seas. Such occurrences afford clear evidence of a recent depression and subsequent elevation of the sea-floor. In geological literature the references made to the part played by boring organisms in the destruction of rocks are only cursory. The destructive action of certain mollusks, annelids, and echinoderms on coral reefs has been recognised. The coral rock is often found so riddled with cavities as to fall an easy prey to the pounding of the breakers along shore. Again, the deepening of the lagoons of atolls has been ascribed in part to the destruction of dead coral by boring animals.

But the importance of the activity of these organisms in the gradual disintegration of rocks along our coasts, and the aid which they afford to the erosive action of the sea have been almost overlooked. Their operations cannot be observed as they are carried on below sea-level, and consequently the true significance of their work has escaped notice.

Interesting observations were made by the late Mr. Clement Reid[1] on the lowering of the foreshore and sea-bed off the Norfolk coast. At the present day extensive submarine areas occur for some miles off the coast, near Cromer, covered with large unworn flints, and forming celebrated crab and lobster grounds. The flints lie on bare chalk, which in this neighbourhood is softer than usual. These areas are known as the "Norfolk stone-bed." This stone-bed extends from between tide-marks down to a depth of about ten fathoms, and consists of an interlocking mass of angular flints with some erratics. Though a permanent feature, and a source of protection to the underlying chalk against the mechanical scour of the tides during gales, it has been shown that the level of the stone-bed does not remain constant, but is gradually lowered. Mr. Reid noted the growing inaccessibility of certain wreckage and large boulders in the sea near Cromer. "These I could formerly reach dry-shod at extreme low water; now I must wade knee-deep." Formerly the village of Shipden[2] lay between Cromer and the sea, and in the survey recorded in Domesday Book Cromer formed part of the lordship and parish of Shipden. This once flourishing village, with its famous church and spire dedicated to St. Peter, disappeared owing to the ravages of the sea about the time of Henry IV. For long the ancient site of Shipden could be reached at very low tide, but now it lies several fathoms below sea-level. The gradual lowering of the sea-bed to its present level is ascribed not to any sinking of the sea-floor, nor merely to ordinary mechanical scour, but to the long-continued eating away of the soft chalk by various rock-boring organisms, amongst which certain mollusks, annelids, and a sponge play the chief part. The chalk in this area, though soft, is exceptionally flinty. The chalk rock of the sea-floor becomes riddled with holes, often large enough to admit the finger, and sometimes larger. The massive rock having been thus reduced to a net-work or honeycomb-like condition easily breaks down, and the included flints are left standing on pillars of the chalk, whence they are readily detached and shifted by mechanical action. The result of this continual cutting away of the soft chalk is that gradually a thick layer of loose angular flints accumulates. It has been estimated that near Cromer the destruction of a thickness of ten feet of chalk will yield a layer at least one foot thick of large flints. In time the sheet of interlocking flints becomes thick and more or less continuous, and the interstices get choked with sand, thus leaving no chalk bare. Organic erosion of the underlying chalk will then cease for a time, but heavy storms often result in the shifting of the flints and the laying bare of another surface of the chalk, when the boring action will begin again.

It would be interesting to obtain some definite evidence as to the rate and extent of this organic erosion. The available data, however, are very scanty. Mr. Clement Reid's remarks on our lack of knowledge regarding these points, and the results of his own observations, may be

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[1] *Report Royal Commission on Coast Erosion*, vol. i. Appendix xii. (B), pp. 166-167.

[2] Hewitt, *An Essay on the Encroachments of the German Ocean*, p. 92, 1844.

quoted. "Unfortunately," he says, "the part played by rock-boring animals in the erosion of rocks out of reach of ordinary mechanical erosion has been overlooked, and I can get no satisfactory evidence as to its rate, or as to the depth to which it occurs. Many small indications make me think that this organic erosion goes on at any depth, wherever rock may be left bare through non-deposition of sediment, or the scour of some current. At extreme low-water *Pholas* is very active in drilling its auger-holes into the chalk, and from lower depths lumps of chalk brought up attached to seaweeds or by the dredge are honeycombed by *Saxicava* or annelids. This means that where living *Pholades* are crowded close together on the chalk foreshore, each generation of the mollusk cuts a series of auger-holes from two to four inches deep, so weakening the intermediate parts that they are easily destroyed when the *Pholas* dies. The length of life of this genus is apparently unknown: but judging from the various sizes of shell found together, I doubt whether it is more than three years. This gives one a rough estimate, a rate of an inch per annum for the lowering of a chalk floor, when exposed to the action of *Pholas*." Allowing for the fact that for some years the chalk may have been protected by a covering of flints and drifted sand, he concludes that a fair average for the erosion is about half an inch per annum.

As to the depth to which such erosion occurs, it may be mentioned that lumps of peat full of the borings of *Pholas crispata*, with the shells still in them, have been dredged up from the Dogger Bank in ten fathoms of water, and the same species has been taken up at twenty-four fathoms depth, and in the open sea by the Marine Biological Association's steamer *Huxley*.[1]

Although these borers show a predisposition to confine their attacks to the soft chalk, they are capable of boring into flint pebbles, especially where the flint has become somewhat rotted.

A stone-bed similar to the one above described has been found at the bottom of the marine Crag Deposits of East Anglia and overlying the chalk, indicating action of the same kind in Pliocene times.

On the south coast of England the depredations of rock-boring organisms from the line of half-tide to depths below low-water mark have been noted at several places. Between Newhaven Harbour and the Black Rock, near Brighton, the coast is flanked by a line of cliffs consisting of flinty chalk, below which lies a foreshore of similar chalk. This foreshore is devoid of beach material owing to the high groynes at Brighton which trap the material drifting along shore from the west. On this bare, chalky foreshore, the results of the activity of the borers are very obvious. Again further west, at Selsey Bill, the wide, flat foreshore is being attacked and lowered by the same means.

It is important to notice that not only does submarine erosion take place as a *direct* result of the activity of these organisms in that they actually eat into the foreshore and sea-bed, but also that *indirectly* they aid coast erosion by gradually reducing the breadth of the foreshore,

[1] *Report Royal Commission on Coast Erosion*, vol. ii. Appendix xxix. p. 2.

deepening the water close in-shore, and so rendering the cliffs more open to the attacks of heavy seas.

Much erosion has taken place at St. Andrews within historic times. Doubtless this was due chiefly to ordinary mechanical scour on the deposits of the 25-feet beach. In early historic times this raised beach extended round the base of the rock on which the Castle stands, intervening between it and the sea. It has now entirely disappeared except for a short stretch bordering the East Sands. The foreshore in front of the city to-day consists, for the most part, of long reefs of hard sandstone, shale, and limestone, and the rate of erosion is greatly reduced. But though slower this erosion has not ceased, and the waste of rock by mechanical means is aggravated considerably by the extensive perforations of marine mollusks, of which certain species of *Pholas* are the most numerous and active. Indeed, at the East Sands, the erosion is still very serious, and the Gatty Marine Laboratory, which stands on the 25-feet raised beach, is in danger. The East Bay is protected from the open sea by spurs of rock on the east side. This bulwark is being gradually reduced, and that largely owing to the activity of rock-borers which pierce into the sandstone and shale. The effect of the gradual lowering and removal of this ledge is the admission of the sea in fuller force into the bay, and consequently a heavier attack by the waves on the foreshore and low cliff.

In British waters various types of invertebrate animals bore into rocks, the most active being certain sponges, worms, and mollusks. At some localities echinoderms are responsible for excavations on a considerable scale, and a minor part is played possibly by polyzoa. In the plant kingdom many algae have the habit of boring into shells, and some of them also may attack calcareous rocks.

The boring Sponges[1] belong to the genus *Cliona*. This genus includes several species, of which the most important is *Cliona celata*. This form was first described by Grant,[2] in the Firth of Forth. The sponges attack shells and calcareous rocks, the surfaces of which become riddled with small perforations (Fig. 1). Narrow galleries or tunnels are cut out beneath the surface, and these intercommunicate so as to produce arborescent patterns, which become exposed as the outer layer of shell or rock flakes off. There has been much discussion as to the method in which the sponge works. It has been suggested that an acid secretion dissolves the calcareous material, but the presence of an acid has not been demonstrated; again, that the sponge bores by means of its spicules, a theory disproved by the observation that in young forms penetration takes place before the spicules develop. The most probable explanation is that the work is due to certain special cells, which are protruded through the sponge epidermis and absorb calcareous matter in much the same way as the osteoblasts of vertebrates absorb bone.

Cliona is found all round our coasts, and the results of its activity are very marked in chalk rock. This form is again particularly abundant

[1] *Report, Royal Commission on Coast Erosion*, p. 1, and M'Intosh, *The Zoologist*, Feb. 1908.

[2] *Edinburgh Philosophical Journal*, p. 1, 1827.

on the sea-floor where Carboniferous Limestone is exposed, as, for instance, at Tenby, in South Wales. With regard to its bathymetrical distribution, Bowerbank[1] gives its range as littoral and down to fifty fathoms.

The Annelids include many forms which burrow in sand, mud, and peat; a few penetrate into rocks of various kinds. Of the rock-borers, *Leucodore* is the most common, and though a small worm it is important on account of its extreme abundance, occurring, where present at all, usually

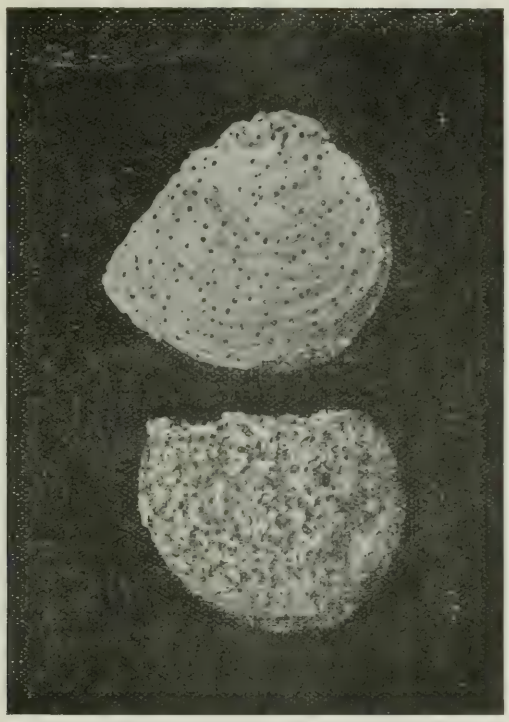

FIG. 1.—Shells perforated by *Cliona celata*. The lower fig. shows the course of the borings after removal of the outer layer of shell.—*From specimens in the Royal Scottish Museum.*

in swarms. Though most destructive in chalk and other calcareous rocks, Professor M'Intosh[2] has shown that it also perforates sandstone, shale, and mica-schist. Its work can be well observed along the rocky parts of the foreshore at St. Andrews, where, in association with the mollusk *Pholas crispata*, it haunts the soft blue shale. The perforations are thus described by M'Intosh: "They are grouped in pairs, sometimes with a thicker and sometimes with a thinner intervening column. . . .

[1] *A Monograph of British Spongidae* (Ray Society).
[2] *Ann. Nat. Hist.*, ser. iv. vol. ii. pp. 276-295.

From the exterior the tubes proceed inwards either as nearly straight or more or less curved cylindrical galleries, and terminate in the case of each pair by joining in a loop at the bottom, the latter being either abruptly or gently curved, according to the thickness of the intervening column. . . . In *Leucodore*, as a rule, the intervening column attains the largest dimensions inferiorly, a considerable wedge of sound shale being often left at the loop." Thus the burrows have two openings, and U-shaped tubes are formed. The rock is penetrated to a depth of an inch and more, and the burrows though minute are very numerous. In certain French localities 250,000 to 300,000 per square metre are said to have been noted.[1]

Sir Ray Lankester[2] held the view that the boring is due to an acid, but this is disproved by the observed fact that this worm also bores into non-calcareous rock. Others have ascribed the boring to the mechanical action of the worm's hooks and bristles.

Another common Annelid borer is *Dodecaceria concharum*. This forms a larger tube, shaped in transverse section like a keyhole, and terminating in a slightly dilated smooth extremity. Apparently this species shows a marked preference for calcareous rocks, though its attacks are not entirely confined to them.

Leucodore and *Dodecaceria* occur chiefly between half-tide and low-water mark, being most common near the verge of the latter. Less important is *Sabella saxicava*, which is found in limestones on the south coast of England. Its bores are circular in form, and often more or less curved and coiled.

A few members of an allied group of worms—the Gephyreans—also bore calcareous rocks around our shores. *Thalassema* has been found in limestone near Dungarvan, and the little *Sipunculus* on the shores of the Isle of Wight. The latter makes cavities even in sandstone on the beach at St. Andrews.[3]

The excavations of shell-fish in wood and stone have attracted notice from early times, and the question of how the creatures formed their dwelling-places has long been discussed, and is still at issue. Amongst the *Mollusca* there are a number of rock-boring forms, the most prominent and familiar around our coasts being *Pholas* and *Saxicava*.

Pholas attacks peat, chalk, limestone, shale, sandstone, mica-schist, and gneiss. It makes larger holes than any of the other forms, and is the most destructive of the rock-boring mollusks. "*Pholas* makes a burrow, minute at its opening, but increasing as it descends, till it takes much the form of a soda-water bottle, except that its lower end is more blunt (Fig. 2). This burrow loosely fits the animal, leaving the latter room to turn round. Its shape is due to the animal burrowing first when very small, so small as to be scarcely visible, and enlarging its hole as it grows, always burrowing deeper, so that no part is necessarily exposed. This orifice becomes enlarged by the action of the

[1] Vaillant, *Annales des Sciences Naturelles, Zoologie*, S. 7, T. xii., p. 43, 1891.
[2] *Ann. Nat. Hist.*, ser. iv. vol. i. p. 233, 1868.
[3] M'Intosh, *The Zoologist*, Feb. 1908.

animal's siphons, partly mechanical, partly chemical, and after the animal's death erosion continues the process."[1] The *modus operandi* is a subject of keen controversy. Some authorities champion a chemical theory, ascribing the perforations to the action of an acid; others insist that the means employed are mechanical. The fact that the animal, though preferring soft rocks like chalk, has been observed to excavate hard *non-calcareous* rocks, is in itself sufficient to disprove the adequacy of mere chemical means. For those who adopt the mechanical theory many possibilities have been suggested.[2] These may be summarised as follows:—

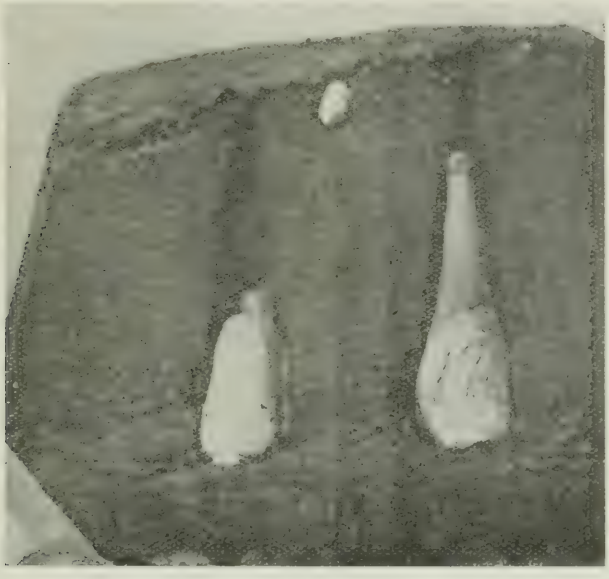

Fig. 2.—*Pholas* in its burrows in "moorlog" (ancient peat).

1. That the perforations are made by rotations of the shell-valves after the manner of augers.

2. That the holes are made by rasping effected by silicious particles in the foot or mantle or both.

3. That the excavations are due to ciliary currents aided by rasping.

4. That the boring is carried out by the foot exerting suction.

5. That the rasping is brought about by the friction of gritty particles of external derivation against the walls of the burrows.

The weight of argument is in favour of the view that the *Pholadidæ* bore mainly by mechanical means, though an acid secretion may in

[1] Borley, *Rep. Roy. Comm. Coast Erosion*, vol. ii. App. xxix. p. 2.

[2] *Ibid.*; and M'Intosh, *The Marine Invertebrates and Fishes of St. Andrews*, pp. 59-60. 1875.

some cases be auxiliary. *Pholas* has been actually observed to use the shell as a filing or rasping instrument. A French naturalist [1] proved that the valves were hard enough to bore the rocks in which the animal is found, and that in gneiss the marks of wear on the teeth were greater than in specimens found in shale. He also succeeded in getting *Pholas* to bore gneiss in captivity. The recent investigations conducted by Miss B. Lindsay [2] at the Gatty Marine Laboratory, St. Andrews, support this view. The details of the process were observed. Miss Lindsay states that in *Pholas* the method of working is double—it sucks and scrapes; and the process may be described as a combination of a nutmeg-grater and a vacuum-cleaner. On one occasion the shell-scraping activity was actually made audible. The wall of a burrow in shale had been partly destroyed, with the result that the animal came in contact with the concrete floor of the tank in which the experiments and observations were being conducted. "The sound continued for hours on several successive days, and much resembled the gnawing of a mouse in wood." It may be mentioned that the shells of *Pholas* are composed of aragonite —a substance which is harder than calcite.

The habit of boring is common to the whole tribe of the *Pholadidæ*. The principal rock-boring species found in British seas are as follows [3]:—

Pholas dactylus, the "piddock," is the largest British species, the shell sometimes attaining to 5 or 6 inches in length and $1\frac{1}{2}$ inches in breadth. On the south coast of England it is found at places in profusion near low-water mark; it occurs also on the west coast of England and Wales and on the Irish coast. Though rare in Scotland, specimens are recorded from the Firths of Forth and Clyde. The tubes of this form reach 8, 10, or even 12 inches in depth. At Tenby, in South Wales, as many as 100 specimens have been taken from 9 square feet of rock.

Pholas crispata has a wide distribution around Britain, but relatively is less abundant in the south of England than it is farther north. The largest examples exceed 3 inches in length by $1\frac{3}{4}$ inches in breadth. It makes burrows up to 3 or 4 inches in depth. This is the species which is the most important in numbers and activity at St. Andrews, its work being especially effective about and below low-water mark.

Pholas candida occurs all round the coast. The shell measurements rarely exceed 2 inches by $\frac{5}{8}$ of an inch. At St. Andrews it is scarcer than the previous form, thriving apparently below low-water. During blasting operations, carried on in 1896 in connection with drainage works, fine examples of this form were thrown up on the beach from depths below low-water mark.

Pholas parva is a smaller form, as its name suggests, the size of the shell being seldom more than $1\frac{1}{4}$ inches by $\frac{1}{2}$ an inch. It has been noted only along the south coast of England, the Bristol Channel, and the west shore of the Irish Sea.

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[1] *Rep. Roy. Comm. Coast Erosion*, vol. ii. App. xxix. p. 2.
[2] *Ann. Nat. Hist.*, ser. viii., 1912, pp. 369-74.
[3] Forbes and Hanley, *A History of British Mollusca*, vol. i., 1853.

Another member of the tribe, *Pholadidea papyracea*, is met with at very low tides embedded in rock on the coast of Devon, and again on the Irish coast. It is a small form and very fragile.

The bathymetrical range of the *Pholadidae* is from between tides to a depth of 25 to 30 fathoms.

Next in importance come the *Saxicavae*,[1] which, although sometimes found free, usually make habitations in rocks. Occasionally they thrust themselves into ready-made crevices or utilise old burrows of *Pholas*, but generally they bore for themselves in calcareous rocks, less frequently in sandstone and shale. The species most active in our seas is *Saxicava rugosa*. The shell of this form may attain a length of an inch and a

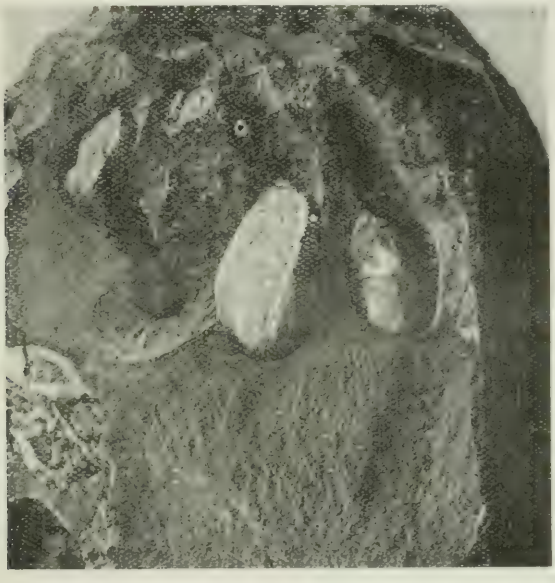

FIG. 3.—*Saxicava* in burrows in limestone

breadth of half an inch. Borings are said to have been observed to a depth of about 6 inches. Wherever chalk or limestone occur on the sea coast the surface of the rock is apt to be riddled by *Saxicavae* (Fig. 3). The action of a solvent is usually invoked to explain the perforations, but, though occurring mainly in calcareous rocks, its bores are also found in other rocks; for instance, Miss Lindsay states that at St. Andrews it sometimes burrows in sandstone. There is some difficulty in crediting *Saxicavae* with mechanical means of boring, as the shells, in contrast with those of *Pholas*, are smooth and fragile, and unarmed with spines. Miss Lindsay states that the boring movements do not seem to be definite in direction and purpose, like those of *Pholas*, and concludes that the creature is comparatively little specialised for this

[1] Forbes and Hanley, *A History of British Mollusca*, vol. i., 1853.

kind of work. Many of the burrows are parallel to the surface of the stone, so that the animal lies on its side. It is possible that the work may be done by rasping either with silicious particles contained in the anterior part of the mantle (the existence of which is uncertain) or more probably by gritty particles of external origin.

Saxicava is found all round the coast of Britain, and its habitat extends from above low-water mark to a depth of over 30 fathoms. Mr. Peach[1] (the father of Dr. Peach) obtained living forms from perforations in a rock specimen obtained from a depth of 30 fathoms, four or five miles off the Deadman, in Cornwall.

A closely allied form is *Gastrochaena*, a borer showing a preference for calcareous rocks, but which has been found also in decomposed granite. It is not common, though prolific at some parts of the south-west coast of England and the west coast of Ireland. Off Torbay, in Devon, at a depth of 10 fathoms, masses of limestone have been taken honey-combed by its excavations.

A rarer form, belonging to the same family as those just mentioned, *Petricola lithophaga*, though abundant on the opposite coast of France, has rarely been met with on our shores. Hitherto it has been noted only in the Bristol Channel and the south of Ireland.

Some Echinoderms form hemispherical cavities in rocks. As long ago as 1825, the surface of a fragment of rock from the coast of Clare[2] was described as being marked by depressions occupied by sea-urchins, and apparently formed by them. The cavities generally corresponded in size and shape with the stage of growth of their respective inhabitants. On that coast thousands of similar cavities in close juxtaposition, and many still occupied by the sea-urchins, were observed on ledges of rock about low-water mark. Occurrences of a like nature were noted off the coast of County Cork. Subsequently excavations made in rocks by sea-urchins have been recorded in Donegal Bay,[3] and in many other parts of the world. Some of the most striking cases occur in the nummulitic limestone at Biarritz. Fischer[4] counted from twenty to a hundred on the floor of troughs measuring 10 cm. deep and 1 square metre in extent. The holes themselves were 2 to 4 cm. in diameter. Another observer, Marcou,[5] in the same region found sea-urchins embedded in their excavations on the walls of pot-holes, the holes being arranged in stories one above the other. Some of these pot-holes were peculiar in that they possessed a central column of rock on the sides of which sea-urchins were also embedded. In some cases the central column, or style, had broken off at the base, appearing as a loose fragment somewhat larger than other stones found at the bottom of the pot-hole. It is inferred that the formation of these peculiar pot-holes is to be attributed partly to the action of the sea-urchins.

The boring due to these animals is not confined to limestones;

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[1] Gwyn Jeffreys, *British Conchology*, vol. iii. p. 83.
[2] Bennett, *Trans. Linn. Soc.* (1827), T. lxv. pp. 74-77.
[3] Duerden, *The Irish Naturalist*, Jan. 1895.
[4] *Annales des Sciences Naturelles*, S. 5, T. 1. pp. 321-332, 1864.
[5] Fewkes, *The American Naturalist*, vol. xxiv. pp. 12-14, 1890.

cases are recorded in sandstone, gneiss, granite, and lavas.[1] Off the coast of Ireland the only excavating species hitherto noted appears to be *Strongylocentrotus lividus*; other forms, such as *Echinus miliaris*, have been noted elsewhere. It seems clear that the habit is not confined to any single species, and the recent observations of Fewkes reveal the curious fact that the same species does not resort to this practice in all the localities in which it is found. "The habit of excavating seems to be one which is limited to individual sea-urchins which live in certain exposed positions, where the tides are very high."[2] This appears to show that the conditions favourable for the work of excavation are environmental or physical.

Many theories have been propounded to explain how the sea-urchins make their hollows. The teeth of these animals are very hard, and the muscles which move their jaws are strong, and so many authorities ascribe the excavations to the gnawing and chiselling action of the teeth. But the depressions are so perfectly smooth and symmetrical that it is thought that the spines covering the test may do a part of the work by a rotatory motion of the sea-urchin, combined with motions of the animal produced by waves and tides. These hollows may serve primarily for protection, and partly also to ensure an adequate amount of water for the animal when the tide retires.

Observations are lacking as to the operations of sea-urchins on the coast of Great Britain. The fact that they are active on certain parts of the coast of Ireland, and on the coast of Brittany should induce naturalists to be on the look-out for evidence of their operations in other parts of the British Isles.

According to M'Intosh[3] certain forms allied to the *Paluxea* perforate calcareous rocks, but data as to their relative importance are wanting.

The total effect of the ceaseless boring of rocks at many localities by some or all of these various types of organisms must be very considerable. The sea, especially during storms, will complete the work of destruction, liberating young forms and larvæ to begin their operations over again on fresh sites. When the element of time is duly given its place as a factor we must recognise the importance of this work in the erosion of the sea-bed.

TRAVEL MEMORIES.[4]

By Lieut.-Colonel A. C. Yate, F.R.G.S., F.R.Hist. Soc.

(*With Illustrations.*)

Looking back from the autumn of 1917 upon the night of 7th June 1881 spent at Dehbid, I found my thoughts straying away to "memories" of Sir Charles M'Gregor, to whom I owed, I believe, my year with the

[1] Fewkes, *The American Naturalist*, vol. xxiv. p. 2.
[2] *Ibid.*, p. 9.
[3] *The Zoologist*, Feb. 1908.
[4] Continued from vol. xxxiii. p. 446.

Afghan Boundary Commission, of Sir Robert Murdoch Smith, to whom I owed my introduction to the Royal Scottish Geographical Society and kindly hospitality at Teheran in 1881, and in Edinburgh and at Granton a decade or so later, and of our hosts at Dehbid and Abadeh in June 1881, Sergeants Hamilton and Hockey of the Royal Engineers. There are few living now who have any personal knowledge of the initial stages (1862-5) of the Indo-European Telegraph line, when it was laid from Baghdad to Teheran and from Teheran to Bushire. The proposed wire and cable route from Baghdad *viâ* Fao and Gwadur to Karachi was found so insecure owing to the malpractices of the Arabs, that this detour by Teheran was adopted as the lesser evil. Telegraphic communication from Europe *viâ* Constantinople with Baghdad was, such as it was, the best method then available. When the present war broke out, three telegraph lines—the Indo-European, Turkish, and Eastern—connected Europe with the East. Practically, on 4th August 1914, the two first were closed to Great Britain. Of the men who made the Indo-European, Patrick Stewart, Goldsmid, Bateman-Champain, Murdoch Smith, St. John, Wells—all, I think, Royal Engineers—have passed away. Some idea of the lives they led and the obstruction with which they contended may be gained from Mr. Dickson's excellent *Life of Major-General Sir Robert Murdoch Smith*. It is with pleasure that I look upon the kindly, shrewd, intellectual face of the portrait that forms the frontispiece of this book. The last time I saw him face to face was in 1895, when he very kindly took me and my wife round the Persian art treasures of the Chambers Street Museum in Edinburgh. I am not aware of any one to whom the museums and art collections of the British Isles are so indebted for specimens of the arts of Persia as to General Murdoch Smith; and my own interest in the Hospitallers of Rhodes and Budrum drew me long ago to study the records of his excavations at Halicarnassus. When we were his guests in 1881 at Teheran, Captain Wells was his assistant, and, succeeding him as Director there, died comparatively young. Lieutenant St. John of the sixties was translated from telegraphy to frontier politics, and as resident at Kandahar in 1880-81 was a prominent figure. His small, active, wiry frame looked equal to any climatic vicissitude, and yet suddenly, to my regret, when he was acting for Sir Robert Sandeman as Agent to the Governor-General for Baluchistan, pneumonia carried him off.

Telegraph work in Persia in the sixties to eighties of the last century was no child's-play, and to its hardships our hosts, Sergeants Hockey and Hamilton, succumbed. Non-commissioned officers of the Royal Engineers who, as bachelors, came out to the Persian Telegraphs, frequently found comfort in conjugal union with Armenian women. Of Sergeants Hockey and Hamilton, one who knew them well writes: "They were the two most powerful men (ordinary human beings) that I have ever seen. Hamilton could, and has, knocked down a mule with a blow from his fist. He could lift the 'top' of a strainer (iron) pole, one in *each hand*, straight off the ground, and carry them above his head. They weigh about a hundred and twenty pounds each.

When the twain were respectively at Abadeh and Dehbid, they used to take it in turn, alternate months, to visit each other." Their pleasure was to meet in a friendly bout with the "gloves," or as boon-companions; and "in death they were not divided." One is buried at Abadeh, and the other close to the post-house at Mashhad-i-Murghāb. Thirty-five years, more or less, have passed away since those things. I myself wondered a little, when Sergeant Hamilton told me of his flocks of sheep, and trapping, and trading in curios, how such private interests were compatible with his telegraph duties; and, as it turned out, they were viewed with no favour in higher quarters. However, all this is dead and buried and gone; and, after all, the telegraph clerk or inspector, who, forty years ago, gathered in the art treasures of Persia, was but a humble follower in the footsteps of the Director who conferred a priceless boon upon the South Kensington Museum. Mr. Dickson's *Life* of his father-in-law is replete with excellent and humorous stories of the cosmopolitan nature of the subordinate telegraph staff, of "pole-shooting," and of other characteristics of those days. I will only repeat one good story, because it chimes in charmingly with our own experiences of Persian postal-horses to which I have alluded, and the apt quotation from Firdausi is a perfect little gem.

On one occasion, shortly after the famine of 1872, when post-horses were scarce and bad, he (Major Murdoch Smith) was riding up the line towards Teheran. His horses broke down between two post-houses. Out of three animals, one was barely able to crawl. As much of the luggage as possible was piled upon him, and the rest was divided between Murdoch Smith, his servant, and the post-boy. Murdoch Smith's share was his heavy English saddle and bridle. Hanging his helmet on his back by a string round his neck, he balanced the saddle on his head, hung the bridle over his arm, and stepped out for the nearest post-house. Soon he out-distanced his attendants, who lagged behind with the jaded animal. Presently he met the Prince-Governor of Shiraz, who was travelling in the opposite direction. On recognising him, the Prince pulled up his horse and exclaimed, "God is great, and Mohammed is His prophet!—but, Ismit Sahib, what are you doing?" "Chaparing to Teheran," was the reply. "Yes, but—in the name of Ali—how? Explain," said the Prince. Murdoch Smith laughed, and quoted the line of Firdausi, "Gahe pusht bar zin, gahe zin bar pusht" (sometimes the saddle bears the back, sometimes the back bears the saddle). The Prince was delighted with the apt reply, and ordered one of his suite to dismount, and give Major Murdoch Smith his horse.

I have in my day had many long and interesting conversations with Persians, and Persian-speaking inhabitants of Afghanistan, Turkistan, India, and the Caucasus, notably Sardar Mohammed Hashim Khan, once an aspirant to the throne of Kabul, the Khan of Kuchan, with whom O'Donovan stayed when bent on visiting Merv, Mirza Hairat of Bombay, who translated Malcolm's *History of Persia* into the Persian language, and last, not least, my chatty and humorous teacher, Mirza Aga Jan of Ispahan and Hydrabad, Sind. The latter's reminiscences of Constantinople (he was a clerk in the Persian Embassy there)

in the days of the Crimean war, and his mimicry of the Feringhee soldiers who frequented the cafés gave me many a good laugh. I never had a Munshi in India that, for a good yarn, could hold a candle to my valued old instructor Mirza Aga Jan. Yet, when it comes to trying to recall a Persian pun or joke, one only comes back to me. I was, in April 1885, paying my respects to the Prince-Governor of Khorasan at Mashhad. In course of conversation he asked if any other officers of the Afghan Boundary Commission proposed to visit Mashhad. I replied that I believed that Captain Gore would arrive in a fortnight, and Mr. Merk a little later. "Ah," said His Royal Highness with a smile, "I thought *marg* (death) usually preceded *gōr* (the grave)." If I may be allowed, before we proceed on our way from Dehbid to Ispahan, to tell one other little Persian anecdote, I would like to do so. After I travelled back from Herat in 1885, along the Perso-Turcoman border to the Caspian, I was moved to write to the *National Review* an article on "Persia as an Ally," in which I gave my opinion of Persian troops and fighting material, and I rather think advocated the array of Turkish, Persian, and Afghan forces, in alliance with the British, against Russian aggression from Central Asia. Sir Charles M'Gregor, during his travels in 1875, naturally studied Persian troops whenever he saw them, and, after some very complimentary remarks about a Persian battery, he adds: "I experienced proud satisfaction in thinking that this superiority of the artillery of the Persian Army was a remnant of the wholesome system and pride in their craft, instilled into them in the days of the gallant Christie. The captain (Sooltan) in command, with whom I rode part of the way, said his father often spoke of Christie Sahib, and of his glorious death at Aslandooz (October 1812), and he added sadly, yet proudly, 'Aye, with leaders like him we 'd do it again.' And I believed him, for dirty and unkempt as his men were, they bore on their fine, manly, bronzed countenances the mark which stamps men, 'fit to go anywhere and do anything.'[1] It will be understood from this that the Swedes had fine material for their constabulary, but the pro-German proclivities of that Scandinavian nation, made so manifest in this war, have diverted their services into a traitorous channel. An article in the *Times* of 4th January 1913 concludes with these words, "Great Britain will do well to see that a due proportion of any money she may lend to Persia is allotted to the Swedish *Gendarmerie*." And so we found the funds to train the instruments which the Germans used

[1] Captain L. V. S. Blacker, of the Queen's Own Corps of Guides, contributes to the *Geographical Journal* for December 1917, a very interesting account of his travels "From India to Russia in 1914." On p. 415 he describes the great cotton-seed oil mills at Andijan, the eastern terminus of the Russian Central Asian Railway system, and adds: "I noticed that a great number of the work-people were Persians, who had an almost inhuman reputation for industry. They were fine stalwart men to look at, and it seemed strange that they should be so *lacking in manly qualities*." The words which I have italicised represent to my thinking rather a current idea than a fact. The material for a good army exists in Persia and awaits honest administration, and good instruction and leadership. This it will get from no one more sympathetically and better than from the Briton; and, if the Russian Revolution breaks up Russia into a score of independent republics, Britain should take the *whole of* Persia under her wing.

against us! However, Sir Percy Sykes has now the handling of that material, and from the Kāshkai to the Kurd and the Bakhtiari to the Baluch, he has a fine and wide range. The theme tempts me on, but let me refer my readers to Curzon's *Persia*, vol. I. chapter xvii., and specially to his account of those fine British officers, Christie, Lindsay-Bethune, and Hart, who, at intervals from 1810 to 1830, put backbone into the Persian troops. The six feet eight inches of Sir Henry Lindsay-Bethune won for him throughout Persia the sobriquet of "the cypress tree," and as a Baronet and Major-General of the British realm, and Commander-in-Chief of the Persian Army, he died in 1851, and was buried in the Armenian cemetery at Teheran. There is nothing like an old cemetery, when we can read the inscriptions on the stones, to waken in our thoughts visions of the men and events of the past. And to think that for a century to come the north of France will be one vast cemetery, as hallowed, if not more so, in British eyes than the field of Waterloo! Waterloo, glorious as it looms in British literature—is it not the theme of De Quincey's "The Mail Coach"?—and, in the history of the British Army, is but a flea-bite in comparison with the Titanic struggle, already of forty-one months' duration, from the Channel to the Vosges.

We were in the saddle at 5.40 A.M. on the 8th of June, and reached Khan-i-Koreh (6 farsakhs, say 20 miles) at 5.40 P.M. Our horses were good and covered the ground at an average pace of seven miles an hour. The road lay through hilly or undulating country, with high mountains here and there flecked with snow, bounding the horizon. Signs of cultivation and fertility were few, but the road was passably good, and from time to time crossed a clear refreshing stream of water. On arrival at Khan-i-Koreh we found that all the post-horses were out grazing and could not be got in under two hours. We therefore proceeded to cook and eat our breakfast. We had a frying-pan and tinned bacon—obstinate bacon, for it would frizzle and melt, without ever getting fried. My mind is rich in theories about cuisine, and I almost think I know the restaurants of Paris as well as the late Colonel Newnham-Davis, but when it comes to the actual practice I stamp myself at once as a mere theorist. With the assistance of the famous "Wyvern" (Colonel Kenney-Herbert) I once cooked an omelet, which really ate uncommonly well, but no skill of mine could induce it to roll up into the compact omelet as it should be served. The chāpārchi at Khan-i-Koreh had but a limited larder; but after he had sold us bread, *māst*, and eggs, he insisted on our partaking of venison of his own killing and cooking. It was like my omelet, palatable, but lacking that charm which attaches to a dish nicely served. A stream of good water and a nice fresh-looking garden close to the *chāpārkhāna* suggested some of the comforts of life; but from the flies, which in thousands pestered us at breakfast there was no escape. We had noticed that in the centre of the courtyard of most chāpārkhānas and caravansarais was a quadrangular covered structure, three or four feet long and varying in area. Sometimes this structure served as dog-kennel, sometimes as a storehouse. Here it was a fowl-house, so we asked the chāpārchi for some feathers

with which to clean out our pipes. Presently the agonised cries of an unhappy fowl assailed our ears. It was sacrificing feathers on the altar of our pipes. Its tortured accents seemed to echo and re-echo the familiar Persian phrase "qurbānot," which means "I am *indeed* thy sacrifice." The extensive plain which surrounds Khan-i-Koreh is bounded to the south by the Kuh-i-Baghu, 11,000 to 12,000 feet high, gathered in the clefts of which the snow lay glistening in the sun. Three days before our arrival, we learned, thieves had walked off with three post-horses. However the three which we wanted came in at 11.30, and by 11.45 we were *en route* for the next stage at Surmeh. The ponies could scarce carry themselves, far less us. Still, there was nothing for it but whip and spur, and the twenty-two or twenty-three miles that lay between Khan-i-Koreh and Surmeh were covered by 4 P.M. Five miles short of Surmeh we struck a streamlet of pure water flowing across the road, and gladly we dismounted and enjoyed a draught. It was sweet as a draught from the pump-spout after a day's bird-nesting in boyhood. Our road previously had led for six or seven miles through an uncultivated valley, till suddenly, rounding a spur of the mountains, we saw the valley of Abadeh stretching before us for forty or fifty miles, with a breadth, say, of ten to twelve. As Surmeh is approached a fine expanse of orchards and gardens flanked the right of our road. We rested an hour at Surmeh—urging feeble beasts is "hard labour" with a vengeance—smoked, munched a biscuit, and took an occasional pull at a "surāhi" full of deliciously cool water. We then started (5 P.M.) for Abadeh and, traversing a succession of villages, gardens, and fields of grain and opium, arrived at 6.40 P.M. at the telegraph station, our resting-place for the night. Our ponies had proved in good fettle, and we covered the fourteen miles at a rapid pace. Abadeh is a large town encircled by high walls (doubtless of mud and sun-dried brick), and embedded, as it were, in a wide area of cultivated farm-lands. Opium loomed large among the crops. I was told that, after the sap of the poppy-pod had been extracted, the natives eat the seed which remains in the pod. An incision allows the juice to ooze out and form a gummy globule on the outside. This is scraped off the next day. All narcotic properties exude with the sap. An Eurasian telegraph clerk entertained us kindly and hospitably at Abadeh. About 7.30 I had a bathe in the tank, as I had had at Dehbid the previous evening, and then we dined and gladly went to roost. The elevation is about 6000 feet, and the nights are chilly.

I look back sometimes and think of the varied houses and persons who so kindly extended their hospitality to us during our ride across Persia. It is even more interesting to study the impressions produced upon others. Sir Mortimer Durand puts it all in a nutshell as "the charm of Persia"; but, if you peruse that "charm," you will find that it blossoms and expands into concrete shape and form. That somewhat stern and bluff soldier, as I remember him, Sir Charles M'Gregor, seems to soften under the witching influence of Persian life, Persian art, and Persian scenic beauty (woman's beauty is taboo in Iran). When he writes: "The prettiest place I saw in Shiraz was the drawing-room of

Nawab Hoosen Ali Khan.[1] This was a small room, with the walls most tastefully ornamented with stucco work, inlaid with mirrors in appropriate patterns, and with pictures interspersed here and there, which gave the room a very cheerful appearance, and did great credit to

Fig. 1.—Reception-room in British Agent's house in Shiraz. 1886.

the Nawab's taste," he seems to suggest tacitly that this decorative "charm"

Emollit mores nec sinit esse feros.

[1] Mr. B. W. Stainton, a reliable authority, tells me that only the head of the family adopts this title "Nawāb" before his name. The junior members put it after the name. "Hoosen Ali Khan Nawāb," is what Colonel M'Gregor should have written. The brother of "Hoosen," or rather Husain, viz. Hasan Ali Khan Nawāb, was well known in India and in London circles. In his latter days I met him and sometimes joined him at dinner in the St. James's Club. He died before Mr. Dickson brought out his *Life of Sir Robert Murdoch Smith*, and a note at p. 261 of that book tell us that his body was taken to Kerbela to be buried. This reminds me that the Turks borrowed a million or two from Kerbela when war broke out, and whatever the Russian Maximalists may think about indemnity, His Majesty's Government will, I trust, see that Turkey pays its debts, principal and interest, to the most holy shrine of the Shiahs.

I am indebted to Mr. B. W. Stainton for a photograph, which I introduce here as an illustration (No. 1), of certainly a room in the house, if not *the* room which Sir Charles so warmly admired. And, as we are dealing with interiors—and be it noted that the doctor is, with very rare exceptions, possibly the sole European who is allowed the privilege of entering the *andarun* of a Persian's house—I think it is interesting to add the one photograph (No. 2) that I possess of a Persian

Fig. 2.—A Persian family. 1885.

family circle. It is left to my judgment to identify the characters there depicted; and I find: the master of the house (left), his mother (right), two wives (seated in centre), seven children, seated and standing, and the confidential old family domestic peering out between the master and his eldest son. The faces are a study of some interest. The old lady has an air of perfect self-possession which empowers her to exhort the others, while the young girl to the left, alone of all the group, seems to find a touch of humour in the situation. The two boys look, one defiant, the other pensive, and apprehension and wonder are reflected

from the little girl's face just below them. The one wife shows a calm confidence, while the other is conventionally bashful; and last, but not least, the master looks very uncertain of the propriety of the whole proceedings. The point never has been decided, and never will be decided, whether the veiled or unveiled woman is entitled to the palm—not of beauty—of virtue. Sir Charles M'Gregor did not move about the bazaars of Persia with his eyes shut, and he remarks (*Khorassan*, vol i. p. 37): "The women seem to go about the bazaars very freely, and though they are most closely veiled, I was surprised to notice that they appeared to talk to any man that they pleased. These may, of course, have been their husbands, but then they may not, as of course no male would be allowed to take off a woman's veil, however strong his suspicions might be."

Religion, distorted religion, has a great deal to answer for in the great problem of the "survival of the fittest," and in Persia, when I come across the Gabr (*anglicè* Guebre) or Zoroastrian, the thought crosses my mind that surely, through much tribulation and persecution, that small remnant of an ancient faith has proved its fitness in surviving at all. I know little or nothing of the Gabr myself, though my Persian studies involved the perusal of that chronicle of the Zoroastrian Kings Firdausi's *Shahnama*; but I am told that, like Scots and Chinamen, they are excellent gardeners.

Before I lay down my pen there is just one other point—and that an etymological one—upon which I would wish to touch. Again I take as my text—although it was really Addington Symonds (*Revival of Learning*, p. 267-8) that set me thinking—a passage from M'Gregor's *Khorassan* (vol. i. p. 39): "I went to call during my stay on the Prince of Fars, the Hissam-oo-Sooltanat, with the Resident or Balioos, as they euphoniously call him." I have a strong conviction that nothing would make that word euphonious. What would you expect from a word which appears in Ducange's *Lexicon of Mediæval Latin* as *Baillivius* or *Bajulivus*, and which in its most pleasing state adopts the form of *Bailli* or *Baily*? Personally the title of Bailli de Suffren sounds pleasant in my ears, for de Suffren himself was a man of whom any heart—even an English one—might be proud. As for *Baily* or *Bailo*, as Addington Symonds entitles the Venetian Consul General or agent at Constantinople, I think it not improbable that the term spread from the Mediterranean through the adjoining countries, with which both the Turks and Venetians had political and commercial relations. When the Portuguese found their way round to the Persian Gulf in the early sixteenth century, I doubt not that the Portuguese agent at Hormuz was known as the *Bālyūz* or *Bālyūs* (بالیوز or بالیوس). It was a title borne by the conventual bailiffs of the Order of the Hospitallers, these bailiffs being, as I understand, next in rank in the Order to the Grand Master himself, unless indeed the Grand Priors had precedence of them. The بالیوس (*Balyūs*) *par excellence* of to-day is the Resident at Bushire in the Persian Gulf, our consuls being generally known as قونسول (*qoonsool*). Finally, let me quote from Sir James Redhouse's

Turkish-English Lexicon (Constantinople, 1890, page 335): "بالیوس, *balyoos*, (Ital. *baglis*). 1. Title of the Venetian Ambassador at the Ottoman Court in olden times. 2. Title, sometimes vulgarly given to all consuls."

DIRK HARTOGS' LANDING IN AUSTRALIA.

By W. Siebenhaar,
Deputy Registrar-General of Western Australia.

Part I.—The Dirk Hartogs Tercentary.[1]

Between the discovery of America and that of Australia there is, as regards almost every feature of the two events, the greatest dissimilarity. Yet there is one remarkable point of resemblance, viz., that in both cases human intelligence, having sufficient reason to be convinced of the existence of vast continents in the direction where they were ultimately found, made deliberate and strenuous efforts to reach these unexplored lands. In the discovery of America the penetration and will-power of one man, Columbus, achieved success. In that of Australia, the shrewdest and most enterprising commercial leaders of a whole nationality, the Dutch, saw their deliberate efforts rewarded after many attempts. Strange to say, although Columbus was probably far more imbued with the scientific than the commercial spirit, the result of his discovery was of the highest immediate commercial value. The discovery of Australia, on the other hand, although achieved no doubt principally for commercial ends, brought its authors the impersonal scientific reward. In speaking of the Dutch as the discoverers of Australia, I am not overlooking the probability that other nationalities may have sighted her coasts before; but as no records of real value have been left, such visits can have no more significance than the indications that vikings and other bold sailors probably reached America long before Columbus.

To examine the claims put forward on behalf of other nationalities is to prove their indefiniteness. Cornelis Wytfliet's book, published in 1597, has been adduced as conclusive proof that Australia was known prior to what may be termed authenticated accounts. Now when it is pointed out that this book gives *Terra Australis* as beginning at 2° or 3° from the Equator, it surely is evident that New Guinea was indicated, and that, as regards Australia, Wytfliet merely reproduced the vague conjectures found on other charts of the period. Old manuscripts have been found bearing in some features a slight resemblance to parts of the Australian coast, but no latitudes appear to be shown. One point alone

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[1] Part I. of this article was read before the Royal Society of Perth, Western Australia, on Oct. 25, 1916; Part II. was written for this *Magazine*. It should be noted that while English writers use generally the form Hartog, Dutch authors employ that of Hartogs, which is used in Professor Heeres' book.—Ed. *S.G.M.*

is distinctly in favour of a Portuguese claim to discovery, the fact that the name "Abrolhos" is given on one of these maps. On the other hand, it has been argued that this name, meaning "Look out," was used by the Portuguese for shoals and other places dangerous to navigation, and was therefore applied by them to more than one such spot, in the same way as the Dutch gave the name "Keerweer" repeatedly when coming to a cape which compelled them to turn about. If the Portuguese or Spanish had any real knowledge of the Australian coast, they certainly never showed any perseverance in turning that knowledge to further account. Nor, in modern times, do they appear to be seriously concerned about their claim to priority. Repeated efforts, on the part of Mr. Malcolm A. C. Fraser, when Registrar-General of Western Australia, to obtain information on the point from the authorities at Lisbon and Madrid, remained unsuccessful, no answer even having been vouchsafed in either case. Both France and Holland, on the contrary, have most readily responded to similar inquiries, and it does not augur well for the possibility of any records of value being ever found in the two Iberian countries, that from them no reply whatever was received. That the Dutch searched for the Unknown Southland with great determination and considerable scientific acumen is amply evidenced by the instructions issued to the navigators who were specially sent from Java early in the seventeenth century. Further, although the subsequent discovery of Australia's west coast was due to what may be termed accident, their exploration of the Gulf of Carpentaria was carried out in so splendidly purposeful and informative a manner, that no doubt can be entertained as to the virtual certainty that, quite apart from accident, they would have ultimately succeeded in any case in making Australia known to the world. Nor is what is said to have been stated by Sir William Temple likely to be true—that they forbade their mariners to make the knowledge of their discoveries public property. For in 1647 was published at Amsterdam, for all the world to buy, the circumstantial account of the voyage and wreck of the *Batavia*, giving complete geographical detail as to latitudes, nature of the land, etc.

Under these circumstances it can cause but little wonder that the first thoroughly reliable historian of the discovery of Australia is a Dutchman, Professor Dr. J. E. Heeres of Leiden. The inaccuracies committed by other writers, as regards facts, names, and inferences, would fill a large volume. It is strange that even compilers who had apparently seen Professor Heeres' book, *The part borne by the Dutch in the Discovery of Australia*, should have committed such egregious errors, and reproduced, for instance, the utterly garbled spelling of Dutch names from carelessly printed publications. But in Heeres' book we have at last a compilation that bears the stamp of scientific investigation and conscientious deduction, and are consequently now on the *terra firma* of true historical knowledge. This I will at once prove more particularly as regards the treatment of perhaps the principal claim contained in the book, that of the evidence that the ship *Duifken*, in 1605, actually explored part of the shores washed by the Gulf of Carpentaria. On the 28th November 1605, the *Duifken*, commanded by Willem Jansz, put to

sea from Bantam with New Guinea for destination. She returned to Banda before June. Unfortunately the log of her voyage has not come down to us, although referred to in official documents of 1618, so that the results achieved are only known indirectly from other records. But these records are sufficiently frequent and definite. In the instructions received by Tasman in 1644, the following passage occurs:—

"The first voyage was undertaken in the year 1606 with the yacht *Duyfken*, by order of President Jan Willemsz Verschoor . . . and the unknown south and west coasts of Nova Guinea were discovered over a length of 220 miles from 5 to 13¾ degrees southern latitude, it being only ascertained that vast regions were for the greater part uncultivated, and certain parts inhabited by savage, cruel, black barbarians, who slew some of our sailors, so that no information was obtained touching the exact situation of the country, and regarding the commodities obtainable and in demand there; our men were, through want of provisions and other necessaries, compelled to return and give up the discovery they had begun, only registering on their charts, with the name Cape Keerweer, the extreme point of the discovered land, in 13¾ degrees southern latitude."

It is evident that they had unconsciously entered the Gulf of Carpentaria, and it is incomprehensible to me how Mr. Collingridge can have looked for a Cape Keerweer *in* 13¾ *degrees* of southern latitude *on the coast of New Guinea*; the definiteness of the *Duifken's* record seems to have left no room for any reasonable doubt. This, one is glad to acknowledge, has apparently been recognised by the Government, which has perpetuated the name "Keerweer" on the Queensland coast, and also named one cape "Duifhen Point," although with an unfortunate corruption of the "k" into an "h," which I trust will one of these days be corrected.

It must, of course, all the time be clearly borne in mind that the captain of the *Duifken* did not realise, any more than his countrymen for many years afterwards, that New Guinea was separated from Australia by the Torres Straits, through which its Spanish discoverer sailed, a few months after Willem Jansz had passed its western entrance while probably mistaking it for a gulf.

As conclusive as Tasman's instructions are the references in the log book of Jan Carstensz, the captain of the *Pera* in 1623, who extended the coastal explorations of the *Duifken* in the Gulf of Carpentaria. For instance:—"We sailed past a large river (which the men of the *Duifken* went up with a boat in 1606, and where one of them was killed by "throws" of the blacks); to this river, which is in 11° 48′ lat., we have on the new chart given the name of 'revier de Carpentier.'" This river was subsequently re-baptized "Batavia," which name it still bears. And again, "In our landings between 13° and 11° we have but twice seen black men or savages, who received us much more hostilely than those more to the southward; they are also acquainted with muskets, of which they would seem to have experienced the fatal effect when in 1606 the men of the *Duifken* made a landing here."

In the absence of the *Duifken's* own log, I am not prepared to say

whether the words "made a landing" in the passage quoted above, can be taken in the literal sense, or whether they are only meant vaguely to refer to an intention to explore the banks of the Batavia river, which was at once frustrated by a hostile attack of the natives.

How the knowledge resulting from the voyage of the *Duifken* was followed up by the efforts of later celebrated Dutch explorers, who gave Dutch names to a very considerable portion of Australasia, is probably too well known to need detailed mention here. What concerns us at present is the next event in Australian exploration, viz., the landing of Dirk Hartogs on the island named after him on the west coast. This event has been described in an article supplied by Mr. Malcolm A. C. Fraser in the *West Australian* of 4th September 1916, which I may here be permitted to quote:—

"On the 25th of October next it will be exactly three hundred years since the first white men who left a definite record of their visit landed in Australia. The following quotation from the Western Australian Year Book for 1905 shows that Dirk Hartogs arrived at the island named after him on October 25th, 1616.

"In October 1616 Dirk Hartogs (Hartochsz), in command of the Dutch vessel *Eendragt* or *Eendracht* (Concord), supercargo Cornelis Buysero, outward bound from Holland to the Indies, entered Shark Bay, and gave his name to the island upon the western side of the Bay. The name 'Dor Eylandt' or 'Dorre Eylandt' (Barren Island), was then, or subsequently, given to the largest island at the entrance of the Bay. A tin plate nailed to a post erected at the north end of Dirk Hartogs' island remained for many years as a memento of his visit. His countryman, William De Vlaming, who visited the island in 1697, relates that he found the plate on the 4th of February of that year, and, taking it away with him, entrusted it to the Governor-General at Batavia, who forwarded it to the Board of Seventeen Directors of the Dutch East India Company in Holland, the president of which was, at that time, Burgomaster Nicolaas Witsen. Vlaming gave a rendering of the inscription, which, translated from the Dutch, runs as follows:—

> "'Anno 1616, the 25th of October.—Arrived here the ship *Eendracht*, of Amsterdam: the first merchant Gillis Miebais of Liège. Dirk Hartogs of Amsterdam, captain.
>
> "'27th Do.—Sailed for Bantam.'

"On the lower part, cut with a knife, were to be read in Dutch the words:—

> "'The under Merchant Jan Steyn, Upper Steersman, Pieter Ledoecker of Bil, Anno 1616.'

"Such, at least, was the wording of the duplicate plate which he caused to be substituted for the one removed. The original plate of Dirk Hartogs was discovered in 1902 by Mr. J. F. L. De Balbian Verster, in the 'Rijks-Museum' (State Museum) at Amsterdam, and it was then seen that the latter part of the inscription thereon reads as follows:—

> "'The under merchant Jan Stins, Upper Steersman, Pieter Dockes of Bil. Anno 1616.'

"Vlaming's inscription was seen by Captain Hamelin, of the French exploring vessel *Naturaliste*, 1801; but the plate had disappeared in January 1822, when King caused careful search to be made for it. This disappearance can be accounted for by a statement made by De Freycinet to the effect that he had removed it and deposited it for safe keeping in the museum of the French Institute, which fact is referred to in the minutes of the society, dated March 23, 1821. In spite, however, of this statement, a careful search very recently made by the secretary of the Institute has failed to discover its present whereabouts.

"Dirk Hartogs examined the coastline between south latitude 26° 30′ and 23°, and called the intervening country 'Eendracht's Land.'"

The event is also referred to in the following words in *The part borne by the Dutch in the Discovery of Australia*, by Professor J. E. Heeres of Leiden, already referred to:—

"In the year 1616 the Dutch ship *Eendracht*, commanded by Dirk Hartogs, on her voyage from the Cape of Good Hope to Batavia, unexpectedly touched at 'divers islands, but uninhabited,' and thus for the first time surveyed part of the west coast of Australia. As early as 1619 this coast, thus accidentally discovered, was known by the name of 'Eendrachtsland.' The vagueness of the knowledge respecting the coastline then discovered, and its extent, is not inaptly illustrated in a small map of the world found in Gerardi Mercatoris Atlas sive Cosmographicae Meditationes de Fabrica mundi et fabricata figura. De novo . . . auctus studio Judoci Hondij (Amsterodami; Sumptibus Johannis Cloppenburgij. Anno 1632. If, however, we compare this map of the world with Keppler's map of 1630, we become aware that Hondius has not recorded all that was then known in Europe respecting the light which since 1616 European explorers had thrown on the question of the western coastline of Australia. In Keppler's map, namely, besides the English discovery of the Trial Rocks (1622), and the name 'T Landt van Eendracht' in fat characters, passing from the north to the south, we meet with the following names, which the smaller letters show to have been intended to indicate subordinate parts of Eendrachtsland: 'Jac Rommer Revier,' 'Dirk Hartogs ree,' F. Houtmans aebrooleus,' and 'Dedells lant.' What is more, Keppler's map also exhibits the south-west coast of Australia.

"Whence all those names? The answer to this question, and at the same time various other new features, are furnished by the chart of Hessel Gerritsz of 1627, and by the one dated 1618, in which corrections have been introduced after date. The 1627 chart is specially interesting. Gerritsz, at the time cartographer in ordinary to the East India Company, 'put together this chart of the Landt van d'Eendracht from the journals and drawings of the steersmen,' which means that he availed himself of authentic data. He acquitted himself of the task to admiration, and has given a very lucid survey of the (accidental) discoveries made by the Dutch on the west coast of Australia. In this chart of 1627 the Land of d'Eendracht takes up a good deal of space. To the north it is found bounded by the

'Willemsrivier,' discovered in July 1618 by the ship *Mauritius*, commanded by Willem Janszoon. According to the chart this river is in about 21° 45′ S. lat., but there are no reliable data concerning this point. If we compare Hessel Gerritsz's chart with those on which (about 1700) the results of Willem De Vlaming's expedition of 1696-7 were recorded, we readily come to the conclusion that the ship *Mauritius* must have been in the vicinity of Vlaming Head (N.W. Cape) on the Exmouth Gulf. From Willem Janszoon's statements it also appears that on this occasion in 22° 'an island was discovered and a landing effected.' The island extended N.N.E. and S.S.W. on the west side. The land-spit west of Exmouth Gulf may very possibly have been mistaken for an island. From this point then the Eendrachtsland of the old Dutch navigators begins to extend southward. To the question, how far it was held to extend, I answer that in the widest sense of the term (Land van Eendracht, or the Southland) it reached as far as the south coast, at all events past the Perth of our day. In a more restricted sense it extended to about 25° S. lat. In the latter sense it included the entrance to Shark Bay, afterwards entered by Dampier, and Dirk Hartogs Island, likewise discovered by Dirk Hartogs."

Here, then, in the voyage of the *Duifken* and the landing of Dirk Hartogs, we have the two events that ushered in the famous series of explorations subsequently made by the Dutch on the Australasian coasts. But before briefly summing up the principal results of the latter, I wish to draw attention to the cause of the numerous accidental visits paid by the Dutch sailors to the west coast of Australia. In their outward passage from the Cape of Good Hope to the Indian Archipelago they contented themselves for years with the course usually adopted by their predecessors, the Portuguese, which lay close to Madagascar in a north-easterly direction. The unfavourable winds, the intense heat, the great number of shallows, and other grave objections to this course, induced them in 1611 to take another route: from the Cape they now ran due east for a considerable number of days, in about 36° S. lat., after which they adopted a northerly course towards Java. The innovation proved so successful that the majority of Dutch vessels from that time onward adopted the new "fairway." But one result, which they had not foreseen, was that the strong trade winds constantly created the danger of their being driven on the western coast of the Unknown Southland. This danger manifested itself to them in due course. As a set-off to the danger, however, there was also the equally unforeseen chance of their sighting that coast, and gradually adding to the civilised world's geographical knowledge. The first sailor who had the good fortune to be made aware of this was Dirk Hartogs, and we have seen what excellent use he made of his luck. After him followed in succession the *Zeewolf*, which in May 1618 sighted land in 21° 20′; the *Mauritius*, two months later, which discovered the "Willems Rivier" in lat. 21° 45′ (possibly the Ashburton); the fleet of Frederick de Houtman, which in 1619 discovered and named the Abrolhos and "d'Edelslandt," the latter after the supercargo, Jacob d'Edel: the *Leeuwin*, which in 1622 sighted the coast named after her:

the English ship *Tryal*, which came to grief on the rocks named after her due west of Cossack (N.W.); the *'t Wapen van Hoorn*, which about the same time was in extreme peril near Eendrachtsland; the *Tortelduyff* (Turtledove), which in 1624 would seem to have discovered and named the Turtledove Shoal: further, in January 1627, the *Gulde Zeepaerd* (Golden Sea Horse), having on board Pieter Nuyts, which sighted the south coast near Leeuwin, and explored that coast for "1000 miles," as far as Nuyts' Reef; in 1628 the *Batavia*, wrecked on the Abrolhos Islands, in consequence of which her commander, Francis Pelsart, making the voyage to Batavia in an open boat to obtain assistance for the crew and passengers left behind, had unusual opportunities for observing the repellent aspect of the coast between the present site of Geraldton and the North-West; and finally, in the same year, the homeward bound *Vianen*, Captain Gerrit Fredericsz De Wit, which grounded off the Kimberley portion of the coast, and subsequently sailed along the shore for some fifty miles, that part of the continent being in consequence named "De Wit's" land. In connection with Pelsart it may still be mentioned that he refers to an already discovered "Jacob Remessens" (or "Rommers") river, about the latitude of 20° 17′, which Mr. Tom Carter, formerly a resident at Point Cloates in North-Western Australia, no doubt quite correctly identified with what is now known as Yardie Creek.

The northern part of the continent, after the voyage of the *Pera* and the *Arnhem*, was further explored in 1636, by Gerrit Thomaszoon Pool and Piefer Pieterszoon.

But the great event in the actual explorations of these coasts by the Dutch was the arrival in Australian waters of Abel Janszoon Tasman, with the yachts *Limmen*, *Zeemeeuw*, and *De Brak* (The Hound). In 1642 he had explored New Zealand and Tasmania, without, however, discovering the east coast of the Australian continent. In 1644 he examined the Australian coast in the Gulf of Carpentaria, and completed our geographical knowledge of that coast, although even he did not become aware of the fact that Torres Strait separated New Guinea from the great Southland. It was he who first applied the name "New Holland" to the western portion of the continent.

The West Coast was again explored in 1648 by the ship *Leeuwrik* (Lark). Eight years later the loss of *De Vergulde Draeck* (The Gilt Dragon), in latitude 30° 40′, gave rise to repeated unsuccessful searches, which, however, brought further knowledge of the coast. In 1658 the *Elburg* anchored in 33° 14′, on the coast of the "Land of the Leeuwin," probably in Geographe Bay.

After this the English explorer Dampier comes on the scene, and the Dutch visits become more and more infrequent. The directors of the Dutch East India Company had begun to slacken in their former zeal, finding that to them Australian exploration was an expensive enterprise without commercial returns. But towards the end of the seventeenth century Burgomaster Nicolaas Witsen, of Amsterdam, was the General Director of the Company. He, being possessed of the true student's love of geographical knowledge, was chiefly instrumental in

fitting out De Vlaming's expedition. De Vlaming set out in 1696 in the *Geelvinck* (Yellow Bunting) with two other vessels, partly to examine the country on the west coast, and partly to look for traces of the *Ridderschap van Holland* (Knighthood of Holland), which had sailed two years earlier, but had not been heard of since. He explored and named the Swan river and Rottnest Island, but reported unfavourably on the country, which he coasted as far as the North-West Cape. His exploration, Burgomaster Witsen complained, was not so thorough as he had been instructed to make it.

Further visits of the Dutch were of minor importance. In March 1705 the *Vossenbosch* (Foxwood), *De Waayer* (The Fan), and the *Nieuw Holland* explored the North-West Coast, and an improved chart of Tasman's explorations was the result.

In 1756 the east and west coast of the Gulf of Carpentaria were visited first by Gonzal and next by Van Asschens, who came into more frequent contact with the natives than any of their predecessors.

Beyond this, however, the efforts of Dutch exploration did not extend. As Professor Heeres says: "The times of Van Diemen had failed to return: the spirit with which he was imbued no longer presided over the debates on colonial matters."

The reason why the Dutch did not colonise Australia is quite obvious. The earlier instructions given to their navigators were, undoubtedly, to take possession of such lands as they might discover, unless, of course, already occupied by too strong a power. But in Australia they found no prospects of trade, not a vestige of even so rudimentary a civilisation as might have yielded scope for lucrative barter. They had no surplus population in search of lands on which to settle for the purpose of wresting from nature the results of hard agricultural labour. They already had numerous rich colonies to satisfy their commercial needs. The incentive, then, for colonisation was wanting, and the wonder is that in spite of this their curiosity made them continue their exploratory efforts so long and with such tenacity.

As to their methods, they were an immeasurable improvement on the extreme cruelties perpetrated by the Spanish in America. Yet at the outset unscrupulous instructions were not wanting, which led to the kidnapping of defenceless savages, and to the consequent wanton provocation of hostilities. The more humane, and at the same time more diplomatic orders of Governor Van Diemen may have partly stopped this cruel and foolish policy, but even so late as the 1756 expedition the record shows that the regrettable procedure of kidnapping was again resorted to with the old results.

But I am not, in this summary of Dutch explorations, voicing either an indictment of, or an apology for, the now historical procedings of any nationality.

What mainly concerns us at present is the fact that the Dutch contributed one of the most remarkable and useful pages to modern history by their persistent voyages to these coasts, and by the scientific manner in which they conducted their geographical investigations. It may be safely claimed that they prepared the foundation of Australian

colonisation by the knowledge they gave the world about this continent, about Tasmania, and about New Zealand: and the date of Dirk Hartogs' landing on the Australian coast, the 25th October, is therefore a day which fully deserves to be remembered by all the civilised population living in these parts under the Southern Cross.

(To be continued.)

Erratum.—In the December issue, owing to a typographical error, the word Karakoram was mis-spelt in the title of Mr. Muir's article (p. 544), and throughout its text. It should be as given above.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

Lectures in January.

The Rev. Dr. Kelman will lecture in Edinburgh on January 31, in Glasgow on February 1, in Dundee on January 30, and in Aberdeen on January 29. His subject will be "America in Arms," and his address will be illustrated by lantern slides.

The first of the series of special afternoon lectures was delivered in the Society's Council Room on December 13, by Lieutenant G. B. Mackie, Black Watch, the title of whose lecture was "At the Somme." In view of the large audience which assembled to hear Lieutenant Mackie, and the limited accommodation which can be provided in the Council Room, it has been decided that the remaining lectures of the series shall be held in the Hall of the Royal Society of Edinburgh, which has been kindly placed at the disposal of the Society for this purpose. The next lecture will be that by Mr. E. P. Stebbing on "Some Aspects of Russia in 1914," on January 17.

GEOGRAPHICAL NOTES.

Europe.

The Ethnology of Scotland.—Professor Arthur Keith publishes in *Nature* for October 4 a useful article summarising recent researches on the question of the racial origin of the inhabitants of Scotland, the article containing numerous references. Points of interest which emerge from the summary are that between three thousand and four thousand years ago—that is, during an early stage of the Bronze Age—the east of Scotland was invaded by short, round-headed people of the Alpine stock. Of this stock, very definite traces remain in Aberdeenshire, Fife, and the Lothians, and generally on the eastern coastal belt of Scotland, while its members seem never to have penetrated to the west in any numbers. Several modern East Coast cemeteries give a percentage as

high as 25-30 of such skulls. Apparently about the same time that the round-headed Alpine invaders were entering Scotland at the east, another invasion was taking place at the west, where early connection with Ireland brought a long-headed group into south-western Scotland. These invaders were apparently of Mediterranean stock. At some very early stage, however—early Neolithic, or perhaps even earlier—Britain was inhabited by members of the long-headed Nordic stock, and since the close of the Bronze period all invaders and immigrants have been invariably of this race, which forms the bulk of the population. Recent investigations by Dr. Matthew Young indicate that to a marked extent the English and the Scots of the west have been derived from a similar mixture of identical human stocks.

Malaria in England.—A curious minor effect of the war is the possible recrudescence of indigenous malaria in England, to which attention is called in a circular issued by the Local Government Board. It is well known that anopheline mosquitoes are found in various parts of England. Numbers of men who have contracted malaria during the course of the fighting on the eastern fronts have returned home, and as their blood contains the malarial parasite, and the carriers exist in this country, these men may serve as foci of infection for the civilian population. Some cases of indigenous malaria have been already recorded in England, which probably originated in this way, and the Board is making inquiries as to the local prevalence of the carrier mosquitoes, and taking other precautions in regard to the disease.

AFRICA.

Types of Rural Dwelling in Algeria.—MM. Augustin Bernard and Edmond Doutté contribute to the *Annales de Géographie* for May 15 an article, accompanied by a coloured map, on the distribution of the various types of rural habitation among the indigenous population of Algeria, which contains some suggestive points. A first classification is, of course, into movable dwellings, that is tents, and fixed habitations, including all the forms of huts and houses. The second category is, however, capable of a considerable amount of subdivision. In Northern Algeria, as might have been expected, the area in which the tent is the dominant form of habitation is far greater than that in which fixed dwellings occur. In a total area of 20,774,000 hectares (1 hectare = nearly 2½ acres), tents are characteristic of an area of 13,000,000 hectares, while *gourbis*, or rough huts, the next most widely distributed form of dwelling, only cover 4,143,000 hectares. But when we come to consider the number of persons occupying the two, the contrast is marked. The number of persons living in tents is estimated as 1,200,000, as against 1,650,000 living in gourbis. This, of course, is due to the fact that the tent is the natural habitation of a migrant pastoral people, which must have large spaces over which to roam. Again, naturally enough, the tent is found throughout the desert and steppe areas, where, owing to want of water, agriculture and settled life

are not possible. In Algeria tents do not occur where the rainfall exceeds 20 inches per annum, and the slight precipitation in the province of Oran enables the pastoral nomads there to push their way to the seaboard. Elsewhere the tent occurs chiefly in the interior.

Just as the tent is the natural dwelling of the pastoral nomad, so the hut or gourbis is the typical habitation of the cultivator of cereals, and thus, while the tent-dwellers occupy the desert areas, so the hut-dwellers tend to occupy the Tell. It is noteworthy that, in contrast to the purely sedentary agriculturist of Europe, the Algerian farmer is only partially sedentary, for he cannot continue to maintain the fertility of his fields by the methods employed. His characteristic rude dwelling indicates the provisional nature of his occupation of his lands. But, in the mountain areas, where a measure of protection can be obtained against the roving nomads of the plains, another type of dwelling, associated with another mode of life, is found. This is the flat-topped house, always associated with fruit cultivation. The fruit-grower must necessarily be purely sedentary, his cultivated plants being of slow growth and demanding continuous care. Again, since fruit trees occupy relatively a small area, and since protection is necessary, the flat-topped houses tend to be clustered in large villages or small towns, while tents and huts alike form only small groupings. In very limited areas in Algeria houses with tiled roofs occur. These represent an improvement on the flat-topped house, and are found especially in Great Kabylia, where, owing to the density of the population, they lodge a number of persons out of proportion to the size of the area of which this type of habitation is characteristic. This type is increasing throughout Algeria generally. Finally, a steadily increasing number of natives now live in houses of the European type. The reason for this is twofold. In part it represents a rise in the standard of living, due to increased prosperity, a deliberate choice of a type of dwelling offering more comfort than any of the native types. But in part it represents the conversion—itself a necessary result of the progress of colonisation—of a part of the original nomads into wage-earning labourers. The spread of the European type of house, in other words, means the progressive break up of the pastoral state and the gradual formation of an individualistic one.

The Ancient Speech of the Canary Islanders.—Lord Abercromby contributed to the first volume of the *Harvard African Studies* (1917) a paper on the Ancient Speech of the Canary Islands, and a copy of this paper has been sent to us. The author points out in the first place that when the natives of the archipelago became known to western Europe in the fourteenth century they were still living in the Stone Age. They had no knowledge of boats or canoes, and there was no intercommunication between the islands, each of which developed in its own way. The study of the speech of the islanders is therefore of much interest, for it is natural to suppose that the archipelago was peopled from the mainland opposite; and since the colonisation was presumably very early, perhaps about 2000 B.C., the language should throw

light upon that of the western Libyans, from which the living Berbers are presumed to have been derived. Unfortunately the remnants of the language are very scanty, including only a few hundred words and some sentences, and even these are obscured by the fact that they were taken down by Spaniards, apparently in an imperfect fashion, and modified by the errors of later transcribers. The known words and sentences are subjected in the paper to a detailed examination, and the conclusion is arrived at that a certain number of words of undoubted relationship with Berber were of relatively late introduction, being due either to intercourse between the mainland and the islands before the arrival of the Spanish and French conquerors, or to the introduction of Berber captives after the conquest. As a whole, however, the ancient form of speech may be presumed to have been a lineal descendant of proto-Libyan.

General.

Appearance of Grass in Ascension Island.—According to a note in the *Kew Bulletin* this barren, desolate island has suddenly been clothed with green, owing to the appearance of a grass, which is forming luxuriant pastures. The grass has not hitherto been described from the island, but is a native of tropical Africa. It is supposed that the seeds have been brought either by birds or by the wind, and have been able to germinate owing to some heavy showers. The plant is an annual, and has appeared on the lower slopes, usually described as rainless; its appearance followed the occurrence of some heavy showers of rain.

Aeronautical Maps.—An indication of the importance which the aeroplane is expected to attain after the war as a means of communication is seen in an article on this subject contributed by Mr. Henry Woodhouse to the November issue of *The Geographical Review*. The author recognises four types of aeronautical maps. The first is the ordinary topographical map, which can be used for aviation if it is on a suitable scale—say, three or four miles to the inch. The French Army map is already used for this purpose. An improvement upon this is the special map, based upon the preceding, but stressing points of importance to the aviator, and including symbols for aerodromes, landing-places, stations where gas can be obtained for dirigibles, and so forth. Such maps also show with special distinctness objects like prominent churches or other buildings, monuments, and other kinds of landmarks. Where it is intended to establish a permanent aerial service along a given route, another type of map is used, consisting only of a strip of territory along the line of travel. This kind of map originated in Italy, and so far has only been used on any scale there. Maps of similar type are, however, being made in America, and a scheme is now under way for the construction of an air-line or great circle route-map from New York to San Francisco. Finally, there is the photographic map, so extensively used in military work. It is possible that in future printed route-maps and the photographic map may be combined, the photograph

being added to the side of the other map, in order to facilitate identification of the terrain.

In addition to the discussion of these different types of maps, which are illustrated by reproductions, the article discusses a considerable number of points connected with aerial transportation, and is one of much interest.

Economic Geography.

Future Economic Developments in France.—In the second part of the new French journal, *Colonies et Marine*, a copy of which has reached us recently, there appears an article on the French Mercantile Marine, by M. Gratien Candace. The article is devoted in part to an exposition of the present position of the merchant fleet, and in part to general economic schemes for the post-bellum period. In the first section a number of interesting details are given as to the merchant fleets of the great nations of the world, including a summary account of the numbers of German merchant ships which were in home ports, on the high seas, in ports expected to become belligerent, and in those expected to remain neutral in August 1914. The calculation is made that of a gross tonnage of 4,500,000 at the outbreak of hostilities, only some 1,000,000 tons remained in German, Austrian, or Turkish ports. Rather more than 1,000,000 tons are lying in ports which are still neutral, suggesting a loss of more than half the original gross tonnage.

The author also considers the causes which have made the merchant fleet of France relatively unimportant, so that it stands fifth on the list, being surpassed by those of Great Britain, the United States, Germany, and Norway. He makes a number of suggestions as to ways in which shipbuilding can be promoted in post-bellum France. Among these he emphasises improvements in the rail and canal system of the interior, in the navigable rivers, and especially in the great ports. Extensive works must, he thinks, be undertaken at Marseilles, Havre, Dunkerque, Nantes, and Bordeaux.

The World's Production of Cocoa.—An article in the *Times* Trade Supplement for October points out that about 40 per cent. of the world's production of cocoa is grown in the British Empire, the Gold Coast being the largest producer. In 1915 the total production may be reckoned at 290,000 tons, and of this the Gold Coast yielded about 26 per cent., Brazil following with about 16 per cent., then, in order of importance, Ecuador (11 per cent.), San Thomé (10 per cent.), Trinidad (over 8 per cent.). Other cocoa-producing countries in the British Empire are Nigeria, Grenada, Jamaica, Ceylon, St. Lucia, and Dominica. The United States are the largest consumers, followed by the United Kingdom, Germany, the Netherlands, France, and Switzerland. An interesting point about Gold Coast cocoa is that it is grown exclusively by native farmers, to whom advice and assistance are given by the officials of the Department of Agriculture. In Uganda over 4000 acres have been planted with cocoa, and should come into bearing during the

next two or three years, while a start has been made, on a small scale, in the Fiji Islands, where the valleys of the wet districts seem very suitable.

NEW BOOKS.

EUROPE.

Highways and Byways of Wiltshire. By Edward Hutton. With Illustrations by Nelly Erichsen. London: Macmillan and Co., 1917. *Price* 6*s.*

This volume of the excellent "Highways and Byways" Series will appeal more to the ecclesiologist and historian than to the lover of nature and the open country, who will find in the pages of A. C. Bradley, Hudson, and Richard Jeffries a fuller appreciation of the natural features—the grey, rolling downs, green valleys, and clear, troutful chalk-streams that give to Wiltshire its peculiar charm and its individuality among the southern counties of England.

But Mr. Hutton has described with loving care the many interesting pre-Reformation churches and other ecclesiastical buildings of the county, and the 437 pages of this volume, packed with details of church architecture and history, will prove a mine of wealth to the student of such matters.

Stonehenge is now generally accepted as dating from late Neolithic times, and as having to do with the worship of the sun. The author, however, dismisses the conclusions of Sir Norman Lockyer and Mr. Gowland, together with all other theories, as incapable of any demonstration: Stonehenge remains for him a mystery —"its age uncertain and its purpose inscrutable." He regards old Sarum, the Roman *Sorbiodunum*, as the common centre of Wiltshire history and civilisation, and gives a most interesting account of the translation of the city to New Sarum, and of the rise of the great Cathedral from the "fair meads" at the junction of the rivers Avon, Nadder, and Bourne. Of the "fair and shining city of Salisbury," the beautiful close, and the glorious fourteenth-century spire that crowns the work of Bishop Poore and Elias de Dereham, he writes with appreciative charm. Not many Wiltshiremen will, however, endorse his opinion that the edifice, from its perfect symmetry and uniformity, is lacking in interest, and "were it not for the majestic and unifying beauty of the triumphant spire, the Cathedral would be so dull as to be disappointing."

Passing to Amesbury, in the valley of the upper Avon, once the most peaceful and remote of country villages, but now the centre of camps of armed men, he quotes from the Arthurian legend the beautiful account of the death of Queen Guinevere, and the carrying of her body from the convent at Amesbury by the repentant Launcelot for burial in King Arthur's tomb at Glastonbury. A full description is given of Marlborough Castle and its successor the Castle Inn, the most noted hostelry on the road between Bath and London. Here the great Chatham "lay" for several weeks, putting all the grooms, waiters and stable-boys into the livery of his house during his stay. The great school which has grown up round the old red-brick building of the Castle Inn the author, however, dismisses in a few lines.

Many pages are devoted to the fine churches and abbeys of North Wiltshire, where he laments the ruined glories at Malmesbury and Lacock—Malmesbury Abbey founded in the eighth century, but many times destroyed and rebuilt—the present building dating from 1142—and Lacock, whose first abbess was the

Countess Ela, widow of William Longespée, Earl of Salisbury, who lies in the Cathedral, in "one of the noblest thirteenth-century tombs in the world." The beautiful little town of Bradford-on-Avon, on the extreme north-western margin of the county—"a place really unique in England, and so full of visible antiquity as to enchant and astonish us"—is famous for its so-called Saxon church, one of the earliest stone churches ever erected in these islands, and believed to be not later than the tenth century. The author, however, will not accept so early a date, and considers it to be the work of Norman hands.

Mr. Hutton is a chronicler of the past rather than of the present, and it is evident that his sympathies are wholly with pre-Reformation times—"before the revolution which filled England with ruins." Yet is this a notable book, and the erudition of the author, together with the charm and distinction of his style, lift it far above the level of the ordinary descriptive guide-books that fill our shelves.

The volume is illustrated by a number of pleasing, but occasionally somewhat weak, line-drawings by Miss Nelly Erichsen.

The Rise of Nationality in the Balkans. By R. W. Seton-Watson, D.Litt., Lecturer on East European History in King's College. London: Constable and Co., Ltd. *Price* 10*s.* 6*d. net.*

In spite of all that has been said and written, and of the later knowledge that has come to us as an outcome of the war, it has to be acknowledged that the Balkan Peninsula and its peoples still remain more or less of a sealed book to the public in this country. An explanation of this may, perhaps, be found in the difficulties of language and place-names, and in the obstacles to travel which have been created by the unsettled conditions which prevailed even before the present great European upheaval. Mr. Seton-Watson has made the affairs of the Near East his particular study, and in the present volume he sketches in outline the history of the growth of the Balkan States from the earliest times at which any trustworthy record is available up to the present time. The subject is of necessity a wide and complex one, and the author has been obliged to compress severely in order to bring it within the compass of the first part of his book. How much this is so may be estimated from the fact that his bibliography includes the titles of some two hundred to three hundred volumes in many languages—but chiefly in German—dealing with the origin and history of the Balkan peoples, their endless feuds and struggles, and their emergence as separate autonomous states from the rule or misrule of their Turkish masters. It is no disrespect to Mr. Seton-Watson's book, which is evidently the fruit of wide and laborious study, combined with the knowledge which only a specialist like himself can bring to bear, to say that had he been able to devote more space to this portion of his subject his book might have gained in clearness. As it is, we confess to a feeling of bewilderment caused by the multiplicity of scenes, and of the actors who crowd the unfamiliar stage.

Mr. Watson points out that of all the nations of the peninsula the first among whom national sentiment revived and took a practical form was the Serbian, "nor can it be emphasised too strongly that the movement among the Serbs was spontaneous, that its success was due in the main to their heroism and endurance, and that they received far less external help than any of their neighbours. . . . But it is well to note at the very outset two peculiar features of Serbian history. Not merely have the frontiers of the Serbian state changed more frequently in the course of the last thousand years than perhaps those of any other European state but they have never included, and do not even to-day include, the whole of the

race; indeed, the fact that they do not is one of the causes of the present war." This, of course, refers to the numbers of Serbs and Croats who inhabit the Banat of Austria-Hungary in the region immediately to the north of the Danube, and whose ambition it is that this part should eventually be freed from the dominance of their secular enemies the Magyars, and become a part of their own country.

With reference to the relations between Serbia and Bulgaria, the following is worth quoting: "It is well to remember that the two nations are to-day in very much the same stage of development as England and Scotland in the fourteenth and fifteenth centuries. In that period, and even much later—as the result of the fatal policy of the first of England's "lawyer statesmen," Edward I.—the fierce, mutual hatred of the two neighbours could hardly be exaggerated. And yet their eventual union was absolutely inevitable; though we, who are wise after the event, must be careful not to reproach our ancestors unduly for their national blindness. The same principle applies to the rival branches of the Southern Slavs, who have no real future unless they agree among themselves. Just as Scotland was too weak and poor ever to attain unaided to national greatness, but was always strong enough to hamper and endanger England's movements at every turn by an alliance with the French, so Serb and Bulgar, by their internecine warfare, have enabled alien powers to overwhelm, or in modern times to control, the destinies of the Balkan Peninsula."

In his chapter on Bulgaria under the Turkish yoke, Mr. Watson refers to the struggle which was required to restore the mother-tongue in Bulgaria to the place usurped by Greek. The Greek Church tried to root out everything Slavonic, and even in the nineteenth century made a practice of destroying the monuments and manuscripts of a historic past (*cf.* the act of the Greek Metropolitan of Trnovo in 1825, when he made a bonfire of the old library of the Bulgarian Patriarchate), a practice which must increase the difficulties of the historian. Mr. Watson remarks that "it is only fair to add that these habits of destruction and the kindred practice of forging historical documents or monuments have been adopted by every race in the peninsula at one time or another. Only the Turks were either too lazy or too contemptuous to indulge in such competition." It is worthy of note that it was only about 1835 that a Bulgarian version of the New Testament was printed in Bukarest, and that the effort to restore the mother-tongue in place of Greek belongs to the nineteenth century. Liturgy, schools, and clergy had been alike Greek, and it was possible for an unobservant traveller to go through Bulgaria so late as the forties of last century imagining that he had been amongst Greeks only. Mr. Watson brings this section of his book (Chapter VII.) down to the time of the massacres of 1876, which inspired Mr. Gladstone's philippic and his "bag and baggage" policy for getting rid of the Turk in Europe.

With reference to the question of Constantinople and the Straits, Mr. Watson remarks that the definite establishment of German control would at once convert the dream of a Berlin-Bagdad railway into the most practical of realities. It has been truly said by a writer in this Magazine (November 1917, page 505) that if Antwerp is "a pistol pointed at the head of England," the Berlin-Bagdad railway in German hands is "a gun pointed at the heart of the British Empire."

The second part of Mr. Watson's book deals with the Balkan wars and the break-up of the league among the Balkan states, and it brings events up to July 1913. In a prefatory note he says that he has not been able to finish with his subject owing to his departure from London on military service. The book thus breaks off rather abruptly, and we are deprived of his views on the happenings of the present war. Those who had the privilege of listening to Mr. Watson's lecture on Rumania, which he delivered to the members of the Society in 1916,

may be able to estimate what a loss this is, and we hope that he may be able to return to his subject. The book contains four excellent maps, and we recommend it to the notice of our readers as a mine of useful and valuable information.

La France de l'Est (Lorraine-Alsace). By V. Vidal de la Blache. Paris: Armand Colin, 1917. *Prix* 10 *fr.*

The publication of *La France de l'Est* is of course prompted by the circumstances of the time; but the volume, as might be expected from the authorship, is one of permanent value, one to which geographers will turn long after the present war for information on all points of geographical interest, direct and indirect, in relation to a region which derives from its situation a peculiar degree of geographical importance. It is divided into five parts, respectively entitled "The Formation of *La France de l'Est*," "The Revolution and Social Conditions," "The Industrial Revolution," "Western and Central Europe," and "The Possibilities of the French Market." Now that the thoughts of all are turned to a large extent to what is to come after the war, it is possible that readers may feel inclined to consult the last three parts first. And there indeed they will find much of great interest both in respect of what is expressly stated and what is in various ways suggested. Still it may be doubted whether at the present time the first two parts do not contain matters of even greater interest, and, at any rate, we would advise even those readers who are most concerned with the near future not to pass them over, even though they carry us back to a remote past. It ought to be explained that under the general term "formation," as applied to *La France de l'Est*, is to be understood not merely the geographical structure but also the social organisation, and to some extent the political history—so much of the history as to enable us to understand how Lorraine—that is the whole of Lorraine, both French and German—together with Alsace could come to be regarded as a unit. Some of its chapters are partly composed of geographical description characterised by all the lucidity and skill of presentation for which the author is well known, but others are on such subjects as the People of Lorraine, the Entry [of the region] into the French Unity, and the Old Régime. And it is in this last chapter that we find matter which is now probably as worthy of attention as anything else in the book, from the light it throws on the difference of the methods followed by the French and the Germans in dealing with annexed territories and the corresponding differences in the results. In more than one place we are shown how the economic life of the region was directed to Central Europe and the Low Countries. "Great interests," the author remarks, "were based upon those relations. The French administration thus found itself, first in Alsace, afterwards in Lorraine, face to face with a thorny problem. If, with the idea of effecting simplification and unity, it decided to incorporate those new provinces within the domain of the customs tariffs instituted in 1664 . . . it cut short a fruitful régime, it ran the risk of drying up important sources of wealth. For Alsace in particular it would have been a grave matter to throw obstacles in the way of buying cattle and selling grain in Switzerland, or to hinder the access for the varied produce of its agriculture to the markets in Germany; and it was nevertheless clear that the maintenance of this régime was opposed to the economic attachment of the province to its new country! Should a remedy be sought in expedients and half-measures? That, no doubt, would have been the policy adopted by a bureaucracy acting at a distance according to its own methods away from the immediate control of the facts. The attitude of our Intendants was quite different: taking counsel from realities, they stood up resolutely for the privilege of the province" (pp. 54-5).

Elsewhere we are told (p. 187) in a passage referring to the large number of Germans present in Alsace, that this was no novelty. "Our Intendants of Alsace, as early as the end of the seventeenth century, noted the fact, and recommended that they should be treated with every consideration, in the interest of the commercial relations which that province, in effect foreign [*d'étranger effectif*], maintained with Germany." The result was that, in 1716, only thirty-five years after the violent seizure of Strasbourg, a governor of Alsace could speak of the magistrates and inhabitants of that city as very devoted *très affectionnés* to the service of the King (p. 48); that, at the time of the Revolution, when the development of manufactures in both provinces, and the fact of the Revolution had changed for the time the relative value of external markets, the region readily entered into full union with France, "a union slowly prepared and patiently ripened—the fruit of reciprocal good-will" (p. 68); and that in 1791 crowds of volunteers, more than were demanded, both in Alsace and the adjoining departments of Lorraine, flocked to the republican standard (pp. 81-82), whereas the Pan-Germanist author Auerbach has found himself compelled to acknowledge with bitterness that "the Alsatian would feel himself lowered in becoming German" (p. 88)—a fact of which there is abundant evidence from other sources. The only illustrations in the volume are two maps, one showing the density of population in German Alsace-Lorraine and the adjoining French departments, and the other showing by cantons the increase and the diminution of population in the same area between 1871 and 1911, the method of indicating these changes serving to accentuate the diminution.

The Western Front at a Glance. New enlarged edition, with an Index. London: George Philip and Son, 1917. *Price* 1*s.* 3*d. net.*

This is a useful little atlas, corrected up to August 1, 1917. It contains an index map of the whole western front, another of the British front at the date given, and 48 plates, on a scale of two miles to the inch, illustrating not only the areas over which the front extended at the time stated, but, a useful feature, some adjacent areas in addition. The changes which took place on the front between July 1, 1916, and August 1, 1917, are indicated. Woods are shown in green, heights in metres, and roads, railways, and canals are separately indicated. So far as we have tested it the index seems good, for most of the names which have come into prominence in the fighting since its preparation are already included. The booklet is of a convenient size, being much more manageable than a folded map.

ASIA.

Scènes de la Vie Révolutionnaire en Chine (1911-14). Par Jean Rodes. Troisième Edition. Paris: Plon-Nourrit et Cie, 1917. *Prix* 3 *fr.* 50 *c.*

In the autumn of 1911 M. Rodes was in Constantinople, having left China some three months before. When the news of the revolution reached him he retraced his steps, returning *viâ* the Trans-Siberian railway to Pekin. He was thus in the country during most of the period of storm, and was an eye-witness of many strange scenes. His book consists in part of vivid and picturesque descriptions of sundry visits made to Shanghai, Hankow, Canton, and Pekin during the progress of the revolution, and in part of sketches of personages and incidents connected with it, based upon information obtained locally. The book is one of great interest,

and gives an exceedingly frank picture of "the disconcerting singularities of a civilisation which is, nevertheless, in certain respects infinitely more refined than our own." The words occur in the middle of a description of a grand banquet given in Pekin, in the summer of 1912, in honour of a rebel general who had rallied to the President of the republic, and had come to take up the official post which was the reward of his change of party. The host was an important mandarin, in close connection with Yuan Chi Kai, and the place chosen a huge European hotel in the foreign quarter. The attitude of the dignified Chinese party to the cosmopolitan crowd which filled the hotel is admirably depicted; but the banquet ended with the brutal murder of the guest of the evening and of his secretary, at the orders of their host. There are other similar tales, and M. Rodes describes Yuan Chi Kai as the Supermandarin, with all the prudence, *ruse*, dissimulation, and implacable ferocity of his caste, put into action with a skill which was sufficient to replace the genius which he did not possess.

But the author makes it clear that the mandarins are not the whole of China. He gives an impressive account of the ruins of the city of Hankow, which was totally destroyed in the autumn of 1911 by a general of the imperial troops, who burnt it as the easiest method of ousting a rebel army which had taken refuge there. The city smouldered for a week, and when M. Rodes visited the ruins in December 1911 there was little left save heaps of bricks. Another visit, twenty months later, showed him the city "in full resurrection. The yellow swarm filled anew the labyrinth of small paved streets, at whose sides the houses were springing up every day as if by enchantment." He adds, "Once again I saw the people of China, the innumerable people of petty traders and farmers, opposing, to the worst calamities, their unwearying resignation, their admirable tenacity of life. After panic, on the morrow of massacre, pillage and fire, they build up once again their roof-trees, reopen their tiny shops, over which the altar of their ancestors presides; they bend anew over their fields, and are soon able, owing to their inexhaustible fertility, to fill up the wide gaps made by death. Blemishes must disappear before this marvellous vitality, which is worthy of our most serious meditation."

The same note occurs again and again elsewhere: "The perpetual miracle of China is this constantly renewed force of instinct, this unceasing triumph of life over all the powers of death and destruction."

The book is well worthy of the attention of geographers, who will find in it incidentally many curious facts.

AFRICA.

Croquis et Souvenirs de la Nigérie du Nord. By Isabella Vischer. Avec une carte et des illustrations dans le texte et hors texte. Préface de M. de Dr. F. Sarasin. Paris: Attinger Frères, 1917.

Written in simple French, in a style which is always clear and interesting, this book gives a vivid and arresting series of pictures of life and customs in Northern Nigeria. It is in the form of letters which Mme. Vischer wrote to her people in Switzerland during the years 1912-1916. Her husband, whom she joined in 1912, had been at first a missionary, then an official in the Colonial Government, and in 1909 he was asked to take over the newly created department of Public Instruction, and in that service had to organise all the native schools. Mme. Vischer had many opportunities of seeing the country as she travelled with her husband when he went to inspect schools. These journeys by train, by cape cart, on horse-

back, or by steamboat are graphically described, and in all places they were most respectfully and kindly received by Emirs, teachers, and scholars who in many ways showed their gratitude. Two chapters give a most vivid description of sailing on the Niger and the Benue, where, after the dryness of Kano, and the granite rocks of Ruma, the luxuriant vegetation on the banks made a very sharp contrast.

It is difficult to pick out any letter which is more interesting than another. The first tells of the author's arrival and landing at Lagos, and her journey to Kano; while the second describes the different types of native, as shown by the servants in her own household. She has chapters on her garden, her horse, the birds, various Mohammedan festivals and customs, and the Hausa work in leather, copper, carved wood, and embroideries. The last chapter is headed "The White Man's Burden."

The book is written with an affectionate understanding of the people, and a charming appreciation of the country, and will give readers a very clear picture of Northern Nigeria as well as some enjoyable hours.

Marching on Tanga with General Smuts in East Africa. By Francis Brett Young. London: W. Collins, Sons and Co., Ltd., 1917. *Price 6s. net.*

This most interesting book reads more like a story of exploration and adventure than the account of a military campaign. The author has keen powers of observation, and a true naturalist's appreciation of the beauties and wonders of the wild tropical country which he pictures with striking effect. Captain Brett Young was one of the medical officers with General Smuts's army in the advance southwards from Taveta, undertaken with the object of driving the Germans from the Tanga railway, and, if possible, outflanking them. They succeeded in capturing the railway line, but the Germans escaped. As an impression of an exciting campaign the narrative presents a vivid picture, but it appeals to us even more as a realistic description of East African scenery. One follows with fascination the long and arduous march from the slopes of Kilimanjaro down the valley of the Pangani river, sometimes through waterless, thorny scrub, and then into the dark miasma of the dense tropical jungle, in which the lions and big game were much less to be feared than the plagues of mosquitoes and other poisonous insects. Through this savage and hostile country they toiled along footsore and weary under a burning sun by day, with nights of bitter cold. At every turning there was the danger of surprise from the enemy, but the Germans seemed determined not to risk any decisive action, and the only fighting was with their retreating rearguard. The worst enemy in the campaign was the country itself, and the casualties from German guns were trifling compared to the losses from fever and dysentery. As medical officer Captain Young had a hard and strenuous time. He often had large numbers of sick and wounded left to his care in the jungle, without any adequate assistance or any hospital equipment, except what he could improvise, and added to these difficulties there was continual suffering from want of food and especially of water. But amidst all the hardships of the expedition it is a pleasure to find the most charming descriptions of the wonderful scenery, the mysterious sounds of the forest, the beauty of the flowers, the singing of birds, the brilliant butterflies and dragonflies. The qualities requisite for the ideal explorer are many, but Captain Young possesses them in a remarkable degree, together with exceptional descriptive powers as a writer. We therefore venture to hope that he may revisit this weird and beautiful country in times of peace to discover more of its wonders and to find the key of its destiny.

BOOKS RECEIVED.

In France and Flanders with the Fighting Men. By LAUCHLAN MACLEAN WATT. Crown 8vo. Pp. x+208. London: Hodder and Stoughton, 1917. *Price* 3*s.* 6*d. net.*

From Gallipoli to Baghdad. By WM. EWING, A.C., D.D. Crown 8vo. Pp. xii+306. London: Hodder and Stoughton, 1917. *Price* 5*s. net.*

La Soberania Chilena en las Islas al sur del Canal Beagle. By J. GUILLERMO GUERRA. Medium 8vo. Pp. 416. With Maps. Santiago de Chile: Imprenta Universitaria, 1917. *Presented by the Author.*

The Diary of Ananda Ranga Pillai. Translated from the Tamil by order of the Government of Madras. Edited by H. DODWELL, M.A., Curator, Madras Record Office. Vol. v. Demy 8vo. Pp. xiv+471. Madras: Printed by the Superintendent, Government Press, 1917. *Price* 4*s.* 6*d.*

La Révolution Russe. By CLAUDE ANET. À Petrograd et aux Armées (Mars-Mai, 1917). Crown 8vo. Pp. 332. Paris: Librairie Payot et Cie, 1917. *Price* 3 *fr.*

Dans l'Incendie Tropical—Angkor, Java, Burma, India (Octobre 1912-Mars 1913). By MARCEL GENLIS. Crown 8vo. Pp. 241. Paris: Librairie Plon-Nourrit et Cie, 1917. *Price* 3 *fr.* 50 *c.*

Ptolemy's Maps of Northern Europe: A Reconstruction of the Prototypes. By GUDMUND SCHÜTTE. Medium 8vo. Pp. 150. With Maps and Illustrations. Copenhagen, 1917. *Presented by the Author.*

James Geikie: The Man and the Geologist. By MARION I. NEWBIGIN, D.Sc. (Lond.), and J. S. FLETT, M.A., LL.D., F.R.S. Medium 8vo. Pp. viii+227. Edinburgh: Oliver and Boyd, 1917. *Price* 7*s.* 6*d. net.*

The Question of Alsace-Lorraine. Pp. 31. *Alsace-Lorraine in England.* Pp. 36. Published by La Ligue Patriotique des Alsaciens-Lorrains, 18 Green Street, London, W.C. 2.

British Rainfall, 1916. By HUGH ROBERT MILL and C. SALTER. Fifty-sixth annual volume. London: Edward Stanford, 1917. *Price* 10*s.*

Census of the Commonwealth of Australia. Appendix. Vol. I.: *The Mathematical Theory of Population, of its Character and Fluctuations, and of the Factors which influence them.* By G. H. KNIBBS, G.M.G., F.S.S., F.R.A.S., etc. Melbourne, 1917.

Colonial Reports (Annual).—Trinidad and Tobago (930); Gibraltar (931); Bahamas (932); St. Helena (933); Ceylon (934); Malta (935); Gambia (936); British Guiana (937); Falkland Islands (938); Sierra Leone (939); Straits Settlements (940).

British Guiana Blue Book, 1916. Demerara: Printed by "The Argosy" Company, Ltd., Georgetown, 1917.

Department of the Interior.—The Mount Rainier National Park, The Rocky Mountain National Park, The Crater Lake National Park, The Mesa Verde National Park, The Yellowstone National Park, The Wind Cave National Park, The Sequoia and General Grant National Parks. Washington: Government Printing Office, 1917.

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

THE GEOGRAPHY OF BRAZIL IN RELATION TO ITS POLITICAL AND ECONOMIC DEVELOPMENT.[1]

By Dr. C. Delgado de Carvalho.

(With Sketch-Maps and Illustrations.)

Introduction.—As a rule environment has a very strong influence upon human history. I should like to point out here some of these influences in Brazil.

Let us note first in briefest outline the history of the country. Brazil was a Portuguese colony for three centuries. Discovered in 1500, it had been almost abandoned by the Portuguese Crown, which preferred India. In 1580 it became a Spanish colony, for Portugal had become part of the Spanish kingdom. The north-east of Brazil was occupied by the Dutch between 1630 and 1654 (Fig. 1). With the restoration of the Portuguese kingdom, Brazil again became a Portuguese colony. The seventeenth and eighteenth centuries were devoted to the exploration of the country and to the formation of our nationality. King John VI. of Portugal fled to Brazil in 1807 when his kingdom was conquered by the Napoleonic armies. In 1822 we became independent of Portugal, and then adopted the monarchical form of government. D. Pedro was our first Emperor. His son, D. Pedro II., reigned for 58 years. In 1889 Brazil was declared a Republic under a federal constitution.

The primary geographical influence that acts upon Brazilian history is that of geographical remoteness. It is the same principle that we find in the history of all colonies: the Brazilian settlements were far from Lisbon, as Britain was far from Rome, as New England was far from London, and the same fact has acted in the same way. The autonomous institu-

[1] A lecture delivered before the Society in Edinburgh on Nov. 27, 1917.

tions of the Portuguese isles of the Atlantic were applied to Brazil: captaincies were formed, but later on the method proved a failure and a central government was substituted.

Like the "Cabildo" in Spanish America, the initial cell of territorial conquest and expansion in Brazil was the Municipal Chamber. It was a Roman institution adapted to neo-Latin necessities, and became the centre of local resistance and national life. Thus we can realise how particularism was truly the characteristic feature of American history from North to South, while Europe was struggling for centralisation and nationalisation. Although the imperial régime implanted among us a temporary centralised system, Federalism, at last, arose from the particularism of our colonial history. Our present Constitution appears thus as a natural consequence of the traditions of our past, and not as a mere adaptation of North American institutions.

We might follow in detail the effect of geographical remoteness upon the history of Brazilian political life, within the boundaries of the great Portuguese colony. The local history of Pernambuco, S. Paulo, and Minas Geraes is rich in episodes to illustrate the consequences of remoteness, and it took the indomitable strength of the mameluk race of S. Paulo to keep together the different parts of the colony.

Particularism, as an effect of geographical remoteness, can be detected in every Brazilian historical centre, each of which has its peculiar characteristics. Pernambuco appears to us as the symbol of republican and radical ideals, relentless throughout our history; Bahia is the symbol of religious faith and Portuguese traditionalism; S. Paulo represents the centre of liberalism in constitutional monarchy first, in civilian republic afterwards; Rio de Janeiro has been and is still the true political centre of the nation, where moderation prevails, where traditionalism as well as liberalism is deeply rooted.

I wish to explain, in broad lines, the "Geography of Brazil in Relation to its Political and Economic Development"; that is to say, to show how, on anthropo-geographical lines, the different geographical conditions have affected our history. I will consider successively the historical meaning of the coastline of Brazil, of its topography, of its rivers, and of its vegetation and climates.

I. Historical Meaning of the Coastline.

The eastern coast of South America is very slightly articulated; it has few important indentations and few islands. The continent is massive, and the Brazilian shores extend from north to south over 36° of latitude. That shows how varied the climatic conditions must be.

Between Ceará and Bahia the coast is protected by a belt of reefs. These stone reefs, says J. C. Branner, are almost unique phenomena. They are lithified marine spits or beaches that have been encroached on from both sides, until their surfaces are swept clean of consolidated portions. The reefs lie off the shore and approximately parallel to it. Usually they have one end connected with the land during low tide. These remarkable natural walls accompany the north-east shore from

Ceará to Porto Seguro, a distance of 1250 miles, with many interruptions. They did not prevent the early colonisation of the coast, and in many ways helped the fishing activities of the coastal populations.

Low and sandy coasts are to be found in Maranhão, Ceará, S. Paulo, Rio Grande do Sul; on the other hand articulated coasts, with ragged contours, prevail in Bahia, Rio de Janeiro, and Santa-Catharina. But history would not support a real distinction between them as concentration coasts and dispersion coasts.

The width of the coastal zone is very variable from north to south, according to the position of the mountain ranges. Very wide at the mouth of the Amazon river and in Maranhão, it becomes very narrow between Rio de Janeiro and Santos. The accessibility of the hinterland varies in the same way.

It would be misleading to study the influences of these data on human geography without bearing in mind that these geographical conditions had to act on newcomers belonging to a civilised, sea-faring people, with hereditary habits and qualities and a colonial policy of their own. They had to adapt their settlements not only to their new environment, but to their own needs and to the methods of their epoch.

In north eastern Brazil the coast of Pernambuco was in turn occupied by two European seafaring peoples, the Portuguese and the Dutch; they behaved in a very different manner. The former meant to settle down and develop the inland resources, the latter had more commercial ideals, and their occupation coincides with the fall-line of the Atlantic rivers (Fig. 1). In the first case the settlers represented a government, in the second they were merely agents of a powerful company.

In both cases, however, the sociologist must consider the need felt by the European element of keeping contact with the mother-country. Native populations, if civilised, would probably have developed in a different way, on the same shores, for the oceanic line of communication would not have had the same importance to them.

That fact helps us to understand the peripheral colonisation which characterises the first period of Brazilian history. This phase may be called the period of *beira* colonisation. "Thus, for nearly two centuries," says an early Brazilian historian, Vicente do Salvador, "the colonists went on scratching the coast like crabs."

The native inhabitants of the Brazilian coast at the time of its discovery were the warlike Tupis, who occupied it from the south of the tropics up to eastern Guiana. They were good canoemen, but, unlike the Aruaks and Caraibs of the Venezuelan coast, they did not find small islands to lure them to open sea navigation.

The highway of communications remained for a long time the sea; even to-day the connection between northern Brazil and Rio de Janeiro is almost exclusively by sea. This fact in early colonisation explains the adoption of the Tupi speech as the "lingua geral," or medium of communication between whites and various Indian tribes speaking different languages. That "lingua geral" arose, in the same way as the "lingua franca" on the coast of the Levant during the Italian

commercial supremacy, or the "nigger English" in the West-African trade.

As a consequence of the peripheral or *hem* colonisation we find in Brazil a striking application of the geographical law of "continuity of territory." João Ribeiro, a contemporary Brazilian historian, shows

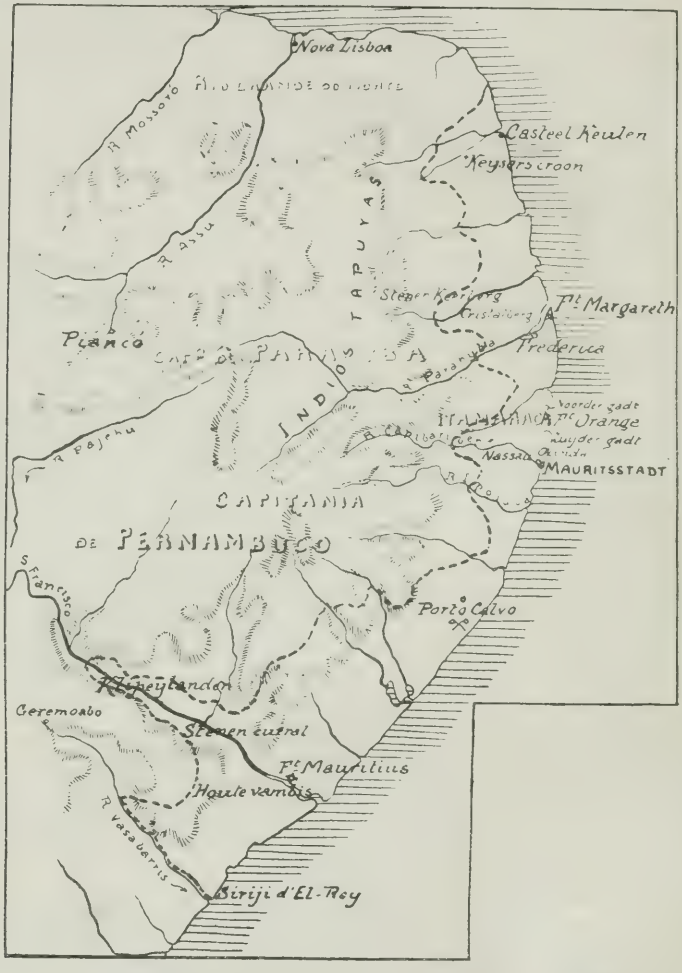

FIG. 1.—Sketch-Map showing Dutch occupation of Brazil, 1630-1654. The inland limit is indicated by the dotted line (after Barlæus).

how, after the colonisation of S. Vicente and Espirito Santo, the connecting link, Rio de Janeiro, was founded; how, after Bahia and Pernambuco, the foundation of Sergipe was needed; towards the south, the occupation of Colonia do Sacramento, on the River Plate, led to the foundation of Laguna and Rio Grande do Sul. The law is applied even when one of the terms of the series is a foreigner, as was the case with the French

in Maranhão, which led nevertheless to the colonisation of the connecting link, Ceará.

Our peripheral colonisation had, of course, great economic consequences. The climatic conditions of the coast compelled the settlers to cultivate colonial products. Sugar was the first of these in which the colonists were interested. The sugar cane was brought to Brazil during the first half of the sixteenth century, and Pernambuco, São Vicente, and later on Bahia were the first areas planted. Cattle-breeding, tobacco, Brazil wood were mere complementary industries. This was the Sugar Period of our commercial history, and the importance of our sugar exports was felt in the international trade of Portugal.

The historical meaning of our coastal topography has had a far-reaching influence on our civilisation. Even now, our great centres of expansion and irradiation are on the coast, or within a few miles from it; their history has deep roots in our past, and our peripheral colonisation has been replaced, to a certain extent, by a peripheral civilisation, although new foci of irradiating civilisation are already in an advanced stage of formation on our highlands, chiefly in the southern parts of the country.

II. The Approach to the Highlands.

The second geographical phase of Brazilian history is characterised by the approach to the highlands and by the conquest of the inland mineral treasures, leading us to the Gold Period of Brazilian commercial history.

In South America there are three distinct mountain systems, belonging to different geological ages:—the Andean Cordillera, with which Brazilian topography is not concerned; the Guiana *massif*, the southern part of which belongs to Brazilian territory; the Brazilian group or highland, which belongs entirely to Brazil.

The latter system is far the more interesting from the Brazilian point of view. The whole country owes to the group its topography and its most prominent social and economic features, for the importance of the Brazilian highlands in the distribution of climatological factors is decisive.

It is a common saying among us that our altitudes redeem our latitudes: one could as well say that Brazil is a gift of the highlands, as that Egypt is a gift of the Nile, or that the British Isles are a gift of the Gulf Stream.

The Brazilian *massif*, like the Guiana *massif*, is composed of a core of ancient rocks, overlaid by newer sandstone. The ancient rocks which form the basis of the vast Brazilian upland belong to two principal geological groups. The first, and older, is formed of gneiss, granite, and mica schist; metalliferous deposits are scarce, but coloured gems are to be found. The second group is chiefly composed of schist, quartz, itabirites and limestone; it contains rich deposits of gold, iron, lead, etc. Rocks of this group have been mined in the mountains of the states of Minas Geraes, the Espinhaço, the Canastra and the Matta da Corda.

In the south of the Brazilian highlands, Devonian and Carboniferous

beds occupy a vast area in S. Paulo, Parana, Santa Catharina, and Rio Grande.

The coastal range extends from the S. Francisco river on the north to the south of the state of Rio Grande. It belongs to the Brazilian *massif*, although several parts are broken by wide valleys, like the Parahyba river. The highest summits belong to the Serra da Mantiqueira, where the Itatiáya reaches 10,000 feet. North and South, the great central *massif* is flanked by lowlands: the Paraguayan plain and the Amazonian plain. These two low-lying areas consist of great river basins, covered by alluvial soil brought from the surrounding orographic systems. The streams have a very slight slope, and both are the highways towards the heart of South America.

About one half of the Brazilian central highland is absolutely unknown, although its principal rivers, the Aroguaya, the Xingú, and the Tapajoz have been explored several times. Lately, the Roosevelt-Rodon expedition has discovered and explored the Rio da Duvida, the largest affluent of the Madeira river.

There is a marked contrast between the northern part of the Brazilian system and its southern part. I wish to draw your special attention to five topographical facts, which explain a great deal of our political and economic history.

First.—The northern system, and especially the Chapada Diamantina in Bahia and the Borborema in the north-east, is much farther from the sea-shore than the southern system, and therefore, more ground is yielded for cultivable plains than by the Serra do Mar, which practically slopes into the ocean in the south of Brazil. In consequence the fall-line is much more remote.

Second.—The average altitudes of the southern system are far more pronounced than of the northern one. The Serra do Mar and especially the Mantiqueira include the highest Brazilian summits at the meeting point of the states of S. Paulo, Rio and Minas Geraes. The passes are very few, much higher and therefore more important than in the north.

Thirdly.—The direction of the southern system is almost parallel to the shore line, and, keeping pretty close to it, allows very few rivers of any importance to reach the ocean, whereas in the north, the directions are different, but generally coastwise, so that the valleys are the real highways towards the interior inland. This fact seems to be decisive in Brazilian history in the seventeenth century. Indeed, the southern system with its few passes constitutes a barrier, whilst the northern system is easily accessible and forms a natural road towards the heights.

Fourthly.—The general aspect of the tableland in the north, its peculiar shape, a low, bushy vegetation, a different geological constitution, with different riches and resources, constitute an altogether different environment and emphasise the social and economic contrasts between north and south.

Fifth.—The climate, which to a certain extent is a consequence of the topography, has more than anything else accentuated the differences and the contrasts; for the north receives the trade winds under quite peculiar circumstances: the almost rainless district of the north-

east has deeply influenced the social and economic activities of its populations.

Many more contrasts could, of course, be found, but the preceding data, although not complete, are sufficient to explain the chief historical contrasts.

As I said, particularism characterises Brazilian history, and every centre, Pernambuco, Bahia, Rio, S. Paulo, has its own historical development and political meaning, but two cycles could perhaps be given for the sake of simplicity: the southern cycle with S. Paulo as its centre, and the northern cycle with Pernambuco as a type.

Let us note how these topographical facts have influenced the different historical facts of our past. Hundreds of Tupi tribes were found by the newcomers. In the south they were met on friendly terms, in the north they were repulsed by the whites. In the south the Indians were protected by a strong barrier of mountains, and the Portuguese had to come to terms with them, and after the adventurer João Ramalho married an Indian chief's daughter, they were allowed to climb up the highlands, where they were received as guests until their settlements were strong enough to overpower any resistance. In the north, the intention of subduing the natives was evident from the beginning, because it was much easier to get at them.

During that first period of commercial history the sugar cane had been introduced in the northern and southern captaincies, but the topography of the north allowed at once the establishment of a great complementary industry, cattle-breeding, so that very soon the colonists were able to draw their own supplies from the accessible interior, and to feed the new centres not only of the north, Pernambuco and Bahia, but even of the south.

The result was that, so far as home production was concerned, the north became cattle-breeder and the south agriculturist. That very fact explains why during the sixteenth and the seventeenth centuries we find the north-east of Brazil the colonial area of great estates, whilst the south represents the country of small landed proprietors, tilled by the colonist himself without slaves or rural workmen.

The second part of the sixteenth century was devoted to the defence of the new colony. The feudal system of captaincies had proved a failure, as I have said, for the element of resistance against internal and external foes was weak. The French, who settled themselves in the bay of Rio de Janeiro, were expelled by the forces of the central government established in Bahia, and the city of Rio de Janeiro was founded in 1567 on a rock at the entrance of the bay, just as Bahia had been founded a few years before. So our first towns were fortresses established on the high ground for defensive purposes (Fig. 2).

The history of the seventeenth century in Brazil is not less connected with the topography of the country. European events had made Portugal a part of the Spanish empire between 1580 and 1640. The great struggle for the liberty of the seas, between the Dutch doctrine of *mare liberum* and the Spanish doctrine of *mare clausum* or monopoly, aroused the interest of the Dutch in the new Spanish colony of Brazil.

Of course the economic development of the north drew their special attention, and in 1624 and 1630 the Dutch conquered Bahia and Pernambuco.

Before 1630 the colonial activity of Pernambuco, inhabited by seafaring peoples, had been a lateral expansion along the coast; thus Parahyba, Natal, and even Camocim were founded. After 1630 the economic necessity of conquering more inland pastures, of subduing the Cariris Indians, and especially of organising for defence against the Dutch, who dwelt on the coast, made the hinterland of Pernambuco a centre of resistance. After twenty-five years of struggle we were able to oust the Dutch from our shores. They had not come to South America with colonising ideas, but only for commercial purposes. They occupied a narrow strip of land on the coast (Fig. 1), and the topography of the Borborema highland allowed the Portuguese settlers, breeders, and soldiers to retire safely and prepare for victory against the invader. Professor Robert Rait wrote in his *History of Scotland*, "If any warfare

FIG. 2.—Bahia, an early Portuguese settlement, placed on high ground for defensive purposes.

made Scotland a nation it was the struggle with Norway; and the victorious issue of that struggle in 1263 may be taken, from this point of view, as the completion and the seal of the consolidation of Scotland." The same words may be applied to Brazilian history. Our victory of 1654 against the Dutch gave us the consciousness of our nationality and sealed our political unity. Spanish America had no external foe to struggle with: that is why Bolivar's dream of unity never came true.

The history of your western shores and isles was almost repeated on our eastern shores, because the same geographical conditions allowed us to organise the defeat of the invader.

For the sake of argument let us suppose that the Dutch episode of our history had been acted at the foot of the Serra do Mar, in the south. Two hypotheses are possible. In the first case, the Dutch would have given up their conquest at once, for the value of the coast would not have been worth heavy sacrifices, if the highland were to remain hostile. In the second case, if the Dutch had felt much stronger, they would have then organised the military conquest of the highlands of

S. Paulo, where a very important Dutch colony would possibly still exist to-day. The enterprise would have been, to a certain extent, easy for them, for the southern settlements were still very weak, and Spain was not very keen in defending colonies that, after all, did not belong to her.

With the colonisation of the S. Paulo highlands by the diplomacy of the sugar planters of S. Vicente, and the colonisation of the Borborema highlands by the armed conquests of the cattle-breeders of the north-east, the historical part of the coastal mountains seems to end. But the importance of the Serras is still great and far-reaching in the economic history of the country, in the penetration of the interior by roads and railways, by foreign influences and activities, in the cost of freights, and in a thousand other details.

III. Historical Part played by the Rivers.

At the beginning of the seventeenth century the penetration of the Brazilian interior was very restricted; from the Parahyba do Sul to the Rio Goyana, in Pernambuco, a strip of ten or twenty miles in width was the only occupied part of the country, and here sugar and cotton were grown.

We then begin to observe how, in the north, the needs of the cattle-breeding industry, and in the south the labour question leading to the enslavement of the Indians, and, later on, the lure of the mines, attracted populations towards the interior. In a new country rivers generally constitute lines of least resistance, and therefore are freely used by the colonists of the coast. Small countries with articulated coasts can easily forgo the advantage of big river systems, but large countries like Russia, China, India, the United States, or Brazil have their political and economic history connected with that of the great rivers.

"South America and Africa are alike in the unbroken contour of their coasts," writes E. C. Semple, "but strongly contrasted in the character of their rivers. Hence the two continents present the extremes of accessibility and inaccessibility. South America, most richly endowed of all the continents with navigable streams, receiving ocean vessels three thousand miles up the Amazon, as far as Iquitos in Perú, and smaller steamers up the Orinoco to the spurs of the Andes, was known to the explorers fifty years after its discovery. Africa, historically the oldest of continents, but cursed with a 'mesa' form, which converts nearly every river into a plunging torrent on its approach to the sea, kept its vast interior, till the last century, wrapped in utmost gloom."

On the other hand, looking at a map of navigable rivers in Brazil, we must admit that the striking feature is that, with the exception of the Amazon and the River Plate systems, there are no rivers representing a considerable extension of the seas, for as a rule the fall-line is not found very far inland. The S. Francisco river, for instance, offers 300 kilometres (about 185 miles), more or less, to navigation from its mouth to the first fall. The Parahyba do Sul has about 100 kilometres navigable in its lower part. Nearly all the Brazilian coastal centres are situated at the mouth of a river, but the fact is more often due to the

necessity of getting free access to the sea at a point where a river generally breaks the sand barrier of the coast, than to the opportunities of inland penetration.

Most Brazilian rivers have a navigable upper stream on the highlands: this is the case with the S. Francisco river, which has a magnificent navigable stretch of 1328 kilometres (about 830 miles); of the Paraná, of the Parahyba, and of the Rio Tiété.

The historical and social importance of these stretches is far greater than that of their lower navigable reach. The main rivers of the hinterland played a pre-Columbian social part in the Indian history of the country. "The Tupi Indians of South America," says E. C. Semple, "a

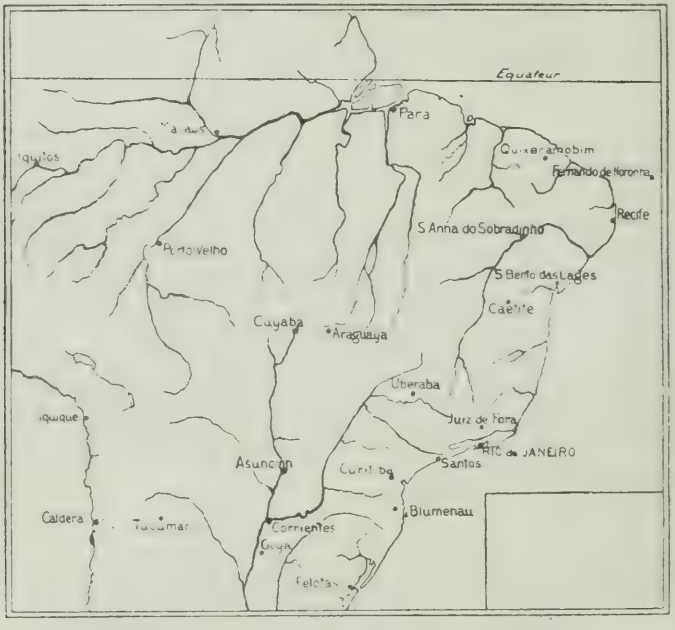

FIG 3.—The River System of Brazil.

genuine water-race, moved from the original home on the Paraguay headstream of the Plata down to its mouth, then expanded northward along the coast of Brazil in their small canoes to the estuary of the Amazon, thence up its southern tributary, the Tapajoz, and in smaller numbers up the main stream to the foot of the Andes, where detached groups of the race are still found. So the migrations of the Carib river tribes led them from their native seats in Eastern Brazil down the Xingú to the Amazon, then out to sea, and along the northern coast of South America, thence inland once more, up the Orinoco to the foot of the Andes." The different stages of Indian civilisation detected in the different parts of their track shows that the highway of Tupi migration has been the Tapajoz, whereas the Xingú seems to have been the highway of their re-emigration."

Most of the inland streams, on the other hand, have been more useful as paths towards the unknown interior than as waterways for transport. The S. Francisco river, in its upper stream, is said to have been the main highway of Brazilian civilisation. The same can be said to a certain extent about the Tiété.

In any case, the penetration of the country by way of its rivers opens a second phase in Brazilian history, it is the era of the Bandeirantes. The Bandeira or Banner was an armed expedition, formed into bands of fifty or more men with horses, mules, civilised Indians and slaves, for the purpose of going into the unknown districts of the country and capturing and enslaving the Indians, for manual labour was already wanting in the Portuguese colony.

The Bandeiras of S. Paulo used to follow the Tiété river down to

FIG. 4.—The Mining District of Minas Geraes, showing the Highlands conquered by the Bandeiras. Sierra da Piedade in the background.

reach Matto Grosso and Goyaz, or to follow the Parahyba river down to cross the Mantiqueira chain and reach Minas Geraes. The Bandeiras of Bahia used to follow the S. Francisco river up to reach Minas Geraes.

The question of the mines began to stir public opinion in the seventeenth century. The great Bandeiras which made the first attempts in that direction were complete failures. The famous Bandeira of Fernão Dias had no better result, in spite of ten years' explorations in the interior. It was not until 1693 that the Bandeira of Rodrigues Arzão found gold in the district of Caethé in Minas Geraes. Gold was discovered in the Serra of Ouro Preto in 1699, and a few years later Villa Rica de Ouro Preto, or Rich City of Black Gold, was founded.

Bandeiras of the south and Bandeiras of the north used to meet in the wilderness, to help one another or to quarrel; these struggles sometimes degenerated into battles, and many a river of the mysterious interior still bears the name of Rio das Mortes—that is to say, River of Death.

The lure of gold and diamonds has been a powerful factor in the economic life of the Portuguese colony as well as in its social development, for thousands of male negroes were bought at Bahia, and driven to the interior, where they mixed their blood with the white adventurers and the Indian natives. That explains why the black element of our population is scarce in the inner parts of the country, where it has been ethnically absorbed by a much stronger element, the mameluk.

An important part in our history is taken by the Paulistas or Bandeirantes of S. Paulo, to whom we owe the extension of our far-western territorial limits. They attacked even the Indians of the Jesuitical Missions, the Reducciones, which were flourishing on the upper Paraná and middle Paraguay.

The historical part of the S. Francisco would, perhaps, have been greater if the Central Government had not forbidden in the eighteenth century all inland communications through the S. Francisco, after the discovery of the riches of Minas Geraes. Direct penetration from the eastern coast was difficult, because a thick tropical forest and undaunted Indian tribes proved a serious obstacle.

In the same way, the present does not draw from the S. Francisco river all the resources the great waterway would allow. Like the Nile or the lower Volga, the S. Francisco in the lower part of its middle stream runs through a semi-arid territory. It acquires thus a new importance for irrigation, but nothing has yet been done in that way. It seems, however, that, in future, that fact will be found to solve one of our greatest economic problems of the north-eastern states.

We come now to examine the two great river systems of penetration, the Paraguay and the Amazon.

I will not dwell on the first, which does not entirely belong to us, but I must remind you that the River Plate has allowed us to keep in contact with Matto Grosso and the centres our Bandeiras had conquered in the central plateau of Brazil. On the other hand, by the very fact that the mouth of the Paraguay does not belong to us, our history has been deeply interested in it from the diplomatic point of view. From the end of the eighteenth century we have been concerned with River Plate questions, for the freedom of its navigation proved to us nearly as important as the Danubian question or the question of the mouth of the Rhine to Europe. We have adopted, therefore, a traditional international policy, which led us to the occupation of Spanish-speaking Uruguay, but we were not able to keep it. During the sixties the question of the navigation of the river, brought about by the crossing of it by the Paraguayan Republic, led us to a long and bloody war against the Dictator, Solano Lopez, President of Paraguay, who had implanted in South America the militarism and despotism which he had learned in Berlin. Throughout the nineteenth century we had to discuss the question with the Argentine, and lately, as it was not quite settled, we were compelled to build a railway to Corumbá, on the Rio Paraguay, in order not to be dependent on the River Plate for our vital communications with Matto Grosso.

The Amazon system is the largest in the world. I do not know

whether the Amazon river was ever mistaken by its discoverers as a way to the Indies and Cathay, but it might have been so, as the Hudson river was, for it looks more like a strait than a river. The Amazonian basin has roughly the shape of a narrow-necked bottle. In the longitude of Obidos, the strait passed by the stream has a few kilometres in width; this is the point where the river separates the Guiana mountain system from the Brazilian highlands. Towards the west the highlands recede southwards; the fall-line is to be found farther up, in the tributaries of the great river.

Most of the rivers of that system are navigable for hundreds of miles, and ocean-going steamers can discharge 6000-ton cargoes as far as 1600 miles from the sea. We find in Amazonia a striking contrast between two facts of anthropo-geography: the Amazonian forest is the greatest obstacle to human penetration, and the Amazonian river is the greatest help to such a penetration.

Historically, that extraordinary system of communication has been used by the Indian natives, but with civilisation it became a political centre, although its social part has not yet been fully achieved, for it is too far from the great civilised centres of Brazil, Perú or Venezuela. Humboldt said it would one day constitute the great centre of human civilisation. That is an original view which I will not discuss here.

The territorial formation of Amazonia belongs politically to the history of the Maranhão State, a Portuguese province founded in northern Brazil. Pará, founded in 1616, was a colony of Maranhão. The colonisation of the valley was greatly accelerated by the missions. Manaos was founded in 1660 as a fortress by Portuguese of the isles, by soldiers and convicts, for the metropolis had ceased to send them to the better parts of the south. The Jesuits colonised the southern margin of the great river, the Carmelites colonised the Rio Negro, and the Franciscans the lower Amazon and its mouth. On the upper Tocantins the Jesuits met the Bandeirantes of S. Paulo at the end of the seventeenth century.

During the nineteenth century the extraordinary progress of the Amazonian districts was due to immigration from Ceará, whose population was fleeing from the periodical droughts of their country.

IV.—Climatic Influences and Colonisation.

It is a peculiar fact that the first settlements in Brazil were not guided by any climatological condition. No regard was ever paid to the heat or the drought in the early colonial establishments. The best parts of the country, namely the southern highlands, were considered second-rate settlements, and the most southern plains were only occupied for military purposes.

Early colonial Brazil was tropical Brazil. Later on the capital was removed from Bahia to Rio, and the prominent political part was thus transferred to sub-tropical Brazil. For the last twenty years it seems that the shifting of economic, if not of political interest, is

still southwards. The colonisation of southern Brazil increases every year in political and economic importance.

I do not wish to dwell on the different climates of Brazil. I have already done this. But I must remind you that Brazil possesses roughly three main climatic types—the *Equatorial type*, with a super-humid sub-type in Amazonia and a semi-arid sub-type in the north-east; the *Tropical type*, with a coastal sub-type in the eastern Brazil, and a mountain and continental sub-type inland: the *Temperate type*, semi-humid, with different kinds of coastal, plain, and highland varieties in the south.

The climates of the Equatorial group appear complementary from the social point of view. The heat of the low Amazonian plain is far from unbearable, although certain districts must not be looked upon as health resorts. On the other hand, the heat of the North-East, coast as well as hinterland, is dry and rather healthy, but rain is scarce, there is a want of water, and the droughts are chronic, and sometimes very severe. It is our semi-arid region where irrigation is required. Of course the mountains and the tableland receive more rain. I have said that these two equatorial districts are complementary, because migration from the dry part to the damp is the striking feature of their history. The Brazilian Sahara invades the Brazilian Sudan.

The banks of the Amazonian rivers are low and periodically flooded; the acclimatisation of European races is by no means an easy problem. The only populations which the Amazonian districts seem to suit are the "paroáras": that is, the refugees from the North-East who are leaving their homes, driven out by the droughts. The Amazonian plain has practically been populated in the nineteenth century by these newcomers. The immigration supplies most excellent workmen for rubber extraction.

Fifty years ago the population of Amazonia was about 300,000 souls, to-day it has reached one million and a half. The city of Pará has nearly 200,000 inhabitants, and Manáos is a town of over 80,000 souls. The proportion of foreigners is the smallest of any other Brazilian centre. On the other hand, during the periods of great droughts, Ceará loses from 10,000 to 50,000 of its inhabitants. Two years ago the drought of 1915 drove about 22,000 persons from their homes. Last year the same districts suffered from floods!

The Amazonian forest, dense and impenetrable, yields precious vegetable treasures which can be approached only by its rivers. Timber, india-rubber, nuts, wild cocoa, medicinal plants are among these riches. The india-rubber fever at the end of the nineteenth century had attracted all activities, cattle-breeding and plantations were abandoned. The consequence was that when the crisis occurred at the beginning of the twentieth century, caused by the competition of the Malay States, Amazonia was economically too weak to resist, and its problems are not yet solved.

The old colonial districts, Pernambuco and Bahia, are still interested in sugar cane, cotton, and cattle-breeding. Pernambuco is the great sugar exporter of Brazil; but Bahia has found in cocoa, the main pro-

duct of its coastal region, a great source of wealth, which gives to Brazil a prominent rank in the cocoa markets of the world.

The north-eastern provinces of Brazil, from the time of their early colonisation down to the present, are still the states showing the highest density of population. The interior or Sertão is also fairly well populated. Thick forests and deserts are absent, and the spreading of colonisation has not been thus prevented or hampered.

In the southern or temperate part of Brazil, as well as on the tropical highlands, the chief social facts connected with climate and vegetation belong to our contemporary history.

Colonisation—and chiefly European colonisation—of the highlands is the characteristic feature of the history of the South during the nineteenth century. Foreign elements were introduced into Brazil by King John VI. in 1818, in the cultivable land of the Serra do Mar, where Novo Friburgo was founded by Swiss colonists. A great colonial effort was made by independent Brazil after 1840, private colonisation was successfully attempted in S. Paulo, and special contracts were made by the Imperial Government with German companies and settlers.

From 1820 to 1916 about 3,500,000 colonists of European birth settled in Brazil. Italians, Portuguese, and Spaniards supplied the larger quota; Austro-Germans and Russians came also in great numbers. Prosperous colonies were established in the states of Rio Grande do Sul, Santa-Catharina, Paraná, and S. Paulo.

At the present time Brazil possesses about forty federal, state, or mixed colonies in Minas Geraes and in the southern states: they are all situated in healthy climates, and lie at an altitude of between 2000 and 3000 feet. The colonists are all absorbed in agricultural labour. Since 1907 our colonial service can be ranked among the best in the world.

Before the great war Brazil used to receive every year 100,000 or 150,000 immigrants, who were immediately localised in colonies of their choice. This movement has, of course, been almost stopped by the war. But I dare say that as soon as peace is restored it will be resumed even in greater proportions.

The whole economy of the east central populations in the states of Rio de Janeiro, Minas, and S. Paulo throughout the nineteenth century has been based on coffee plantations. After the Sugar Period and the Gold Period of her history Brazil entered her Coffee Period, and that period is drawing to a close, not by the decrease in production or quality, but by the proportions that other products are taking with the war. Brazil is no longer only the coffee country of the world—meat, beans, rice are exports increasing in unheard-of proportions. We have discovered coal and standard oil, to-morrow we will be able to work on our tremendous iron deposits, the richest on earth, and that will be the Iron Period of Brazilian commercial history.

DIRK HARTOGS' LANDING IN AUSTRALIA.[1]

By. W. Siebenhaar,
Deputy Registrar-General of Western Australia.

Part II.—The Authenticity of Dirk Hartogs' Landing.

When the subject of the tercentenary of the first authentically established arrival of the white man in Australia was, on the initiative of Mr. Malcolm A. C. Fraser, then still Registrar-General of Western Australia, brought before the public of Perth, it was anticipated that the interest in so important an historical event would not be confined to the western State, but that the eastern members of the Commonwealth Federation would evince the same enthusiasm that was displayed locally. But, unfortunately, the infection of local ardour was, almost at its birth, to receive a check. In the *Sydney Morning Herald* of October 7, 1916, Mr. George Collingridge sought to discredit the account of Dirk Hartogs' visit to this coast, and attempted to establish a belief that De Vlaming perpetrated a fraud in order to give his country a claim of prior discovery. In the face of published knowledge to the contrary, he referred to Vlaming's statements as the first authentic record relative to Dirk Hartogs' plate, and by a chain of reasoning constructed from fragments of doubtful information and complete error, tried to prove Vlaming an inventor of false evidence, and Dirk Hartogs a myth.

This cold-water bath, administered by a presumed "authority," naturally did not miss its effect on a public to which the sources of first-hand information on such a subject as this are practically inaccessible, and the tercentenary passed into oblivion. In the circumstances a reply to Mr. Collingridge's statements seemed at the time almost a waste of energy, and the matter remained in abeyance. Recently, however, a copy of the March issue of the *Scottish Geographical Magazine* came to hand, which revived the subject in an article by the Rev. J. Bryant (vol. xxxiii. p. 120; see also p. 374). The occurrence has made it apparent that, unless checked, the circles created by the stone of error which Mr. Collingridge has thrown into the placid water of public opinion will spread until they are beyond the reach of clear reasoning, which alone can turn them back. To be consistent, Mr. Collingridge should have gone further than he has, and contended that "Vlaming" also was a myth. For if it was so easy for Vlaming to concoct, for patriotic (?) purposes, a lying story about his long-deceased countryman, what was there to prevent the Dutch authorities, with whom his modern accuser implies he was in league, from inventing Vlaming himself, considering that, according to Mr. Collingridge, "even Vlaming's narrative has only been found recently." It is to be feared, however, that the Sydney historian is not sufficiently expert to disentangle the historical evidence available in this case.

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[1] Continued from p. 28.

I will take *seriatim* the statements in which he has expressed his suspicion. He sets out by a reference to Vlaming's report of having found a plate placed on an island, and then speaks of this island as "since called Dirk Hartogs' Island." Now the name "Dirk Hartogs' Island" was neither given by, nor "since," Vlaming. As early as 1627 a chart was drawn by Hessel Gerritsz, cartographer to the Dutch East India Company (reproduced on page 9 of *The Part borne by the Dutch in the Discovery of Australia*), on which the Western Australian coast, at one time known as "Land van de Eendracht," bears that name, whilst "Dirk Hartogs'" visit is explicitly referred to, and the island shore described as "Dirk Hartogs' ree" (Dirk Hartogs' coast). The next blunder in the *Sydney Morning Herald* is that Vlaming is said to have taken the plate he had found "back to Holland with him." In reality he took it with him to Batavia, whence subsequently, in November 1697, it was forwarded to Holland by the Governor-General and Councillors, with their full report of the circumstances.

But Mr. Collingridge's doubts are more fully expressed in the following words:—"A Dutch expedition passed through the Straits to the south of America, and arrived at Jacatra, near Bantum, in Java, on October 26, 1616, just one day after Dirk Hartogs' alleged departure from the coast of the Great Southland, in a vessel of the same name, *Eendracht*, on his way to the same place—Bantum, in Java. The two expeditions, if there were two, must have met, and yet I have searched in vain for a mention of their meeting in Lemaire's very careful and detailed narrative. The matter is very mysterious, and suggests some kind of fraud." This piece of comment only proves Mr. Collingridge's ignorance of Dutch history. The Dutch had gone through a period—in fact were still in a period—when unity of action on the part of the then combined original little kingdoms, counties, duchies, and bishoprics which had for centuries formed a weakly coherent agglomeration of States in the country now called "The Netherlands," was an imperative need in view of the terrible war they were waging with the might of Spain. The words "unity," "union," "concord" (*eendracht*) had become as popular mottoes as to the later French were those of "liberty," "fraternity," "equality," "indivisibility." Being largely a seafaring race, what wonder that the Dutch used words like these as names for their ships. I have no doubt that their merchant fleet in those days contained quite a large number of vessels named "Eendracht." There is, therefore, nothing very mysterious about two vessels called by that name being approximately at the same time at one of the principal ports of Java. The new discoveries in various parts of the world were so numerous that each captain might well for the time being have been chiefly preoccupied with his own explorations, and not have found anything very striking in the particular addition just made by another to the general fund of knowledge. In fact, he might not even have heard of it at once. Dirk Hartogs' boat was one—not, perhaps, the principal one—of an expedition sent for ordinary purposes of commerce from Holland *via* the Cape to Java. She had been accidentally parted from the others, had gone too far south, and, again accidentally, struck land on the west coast of

Australia. Her captain was no explorer, but an ordinary sailor, who, in leaving a commemoration plate on the coast he had found, only carried out the instructions given by the far-seeing Dutch East India Company to all its captains. The incident may not at the time have created any very great impression in Java, although undoubtedly the astute representatives of the Dutch commercial fraternity took careful note of the fact, which was duly recorded (*see* Professor Heeres' book, page 8). The plate found in the Amsterdam Museum by Mr. De Balbian Verster, not many years ago, had by past officials, ignorant of its origin—who were perhaps also confused by the two vessels named *Eendracht*—been marked as, according to tradition, found in the Straits of Magellan. It is curious that the subject of so deep an historical plot, as Mr. Collingridge evidently supposes this plate to be, should have been so carelessly left to ill-informed officials who, by their procedure, risked and brought about the exposure of the whole intrigue! Mr. Collingridge makes a further very positive statement when he says: "It is . . . plain and quite clear that the commemorative tablet (Vlaming's) was fixed up on February 1." The reference is to a quotation from one of the journals (one other journal at least is still in existence) kept on a vessel in the small fleet of three under Vlaming's command. The words, in translation, read as follows:—"On February 1, early in the morning, our little boat went fishing off the shore; our first pilot again went with De Vlaming's boat to the inlet; and our skipper went ashore, intending to fix up a commemorative plate." This journal was evidently not kept on Vlaming's own vessel. He may never have seen it. It does not say that the plate was actually fixed up, only that the skipper went ashore with that intention. Even if he carried out that intention, he may have acted independently for his own ship, in accordance with the general instructions of the Company already referred to. The matter may have had nothing to do with Vlaming's own course of action. But supposing it had, even then there was no reason why after the discovery of Dirk Hartogs' plate on the 3rd, a new tablet should not have been at once prepared and substituted in view of so important a discovery, as the ships only sailed on the 4th. The scribe who kept the log-book referred to, on a vessel not Vlaming's own, may not even have been acquainted with Vlaming's final proceedings in the matter. Any one of these suppositions is sufficient to dispose completely of Mr. Collingridge's next would-be puzzle. I will again quote his words, and leave the reader to judge for himself: "'On the 3rd Vlaming's chief pilot returned on board. . . . He brought with him a tin plate . . . on which was cut the name of the captain, Dirk Hartogs, . . . of the vessel *De Eendracht* . . .' Then, how in the name of everything that is mysterious, could the first commemorative tablet, fixed up two days before, contain the information said to have been found on another tablet two days later?" It will be apparent to any one who calmly analyses the facts that it is nowhere implied that "the first commemorative tablet" contained that information. Coming to his conclusions, our critic summarises as follows:—"My conclusion is that Vlaming's voyage was undertaken in order to set up a claim of discovery for the

year 1616—that Dirk Hartogs never existed, or, at any rate, that he never visited the coast of Western Australia in 1616." This conclusion pre-supposes the following absurdities:—(*a*) That the plot suggested did not originate with Vlaming, but with the Government in Java in 1616, which recorded Dirk Hartogs' visit to Western Australia; (*b*) that it took more concrete form in the map of Gerritsz in 1627, which proves that the Dutch had already a more detailed and correct knowledge of the Western Australian coast than any other nation; (*c*) that the Director of the Dutch East India Company in Vlaming's time, the splendidly progressive, enlightened, and kindly Burgomaster, Nicolaas Witsen, was in reality a cunning actor, who dissembled even in his correspondence with his friends, in order to keep up the colossal hoax planned by his ancestors; (*d*) that Vlaming also was a consummate actor, except for a capacity for committing incomprehensible blunders in his reports (according to Mr. Collingridge), although these reports were all the time carefully planned to deceive the whole world; (*e*) that this cleverly blundering Vlaming was so cunning as even to differentiate on his commemoration plate between the Dutch spelling of 1616 and that of 1697; (*f*) that the Dutch authorities of the nineteenth century had so completely forgotten the hoax planned by their predecessors as to leave the plate ascribed to Dirk Hartogs in the hands of ignorant officials, thereby enabling Mr. Collingridge, of Sydney, to expose the whole plot. "The avowed object of Vlaming's expedition was to search for the *Ridderschap van Holland*, lost between the Cape of Good Hope and Batavia in 1685. This searching for a ship and survivors, lost eleven years before, looks very much like an excuse for the furtherance of some other object, one other object of the expedition being, apparently, the fixing up of claims of discovery." Now, what are the facts? The *Ridderschap van Holland* sailed in 1694, two years before Vlaming's expedition, not eleven, as Mr. Collingridge alleges. To find traces of her was a secondary, not, as he states, "the" avowed object of Vlaming's expedition. Vlaming's instructions on the point are quite explicit. The gaining of further knowledge about Western Australia was the all-important object in view.

Mr. Collingridge has sought further to intensify the atmosphere of mystery by dwelling on the present disappearance (it may, of course, still be found) of Vlaming's plate from the records of the Paris Institute. Obviously this has nothing to do with Vlaming himself, or the Dutch authorities, as De Freycinet's book, published in the nineteenth century, gives all the facts required.

I trust that this analysis of Mr. Collingridge's somewhat aggressively suspicious, but scarcely accurately thought-out, statements, will dispose of the fantastic and more or less preposterous suggestion of a great national conspiracy on the part of the Dutch, especially as the plot would apparently have culminated in the actions of the culprits at a time when, by their growing lethargy and indifference, they had so evidently lost all interest in further colonial expansion.

JOHN ADAIR: AN EARLY MAP-MAKER AND HIS WORK.

By Harry R. G. Inglis, F.S.A. Scot.

When a wordy dispute arises between two antagonists of fairly equal calibre, however important the point at issue may be, the onlooker is usually only interested in its amusing side. In no case is this side more observable than in the papers preserved in the Register House, Edinburgh relating to Slezer, the author of *Theatrum Scotiae*, and John Adair, the map-maker.

Of Adair's personality or history we know little more than that between 1682 and 1688 he drew a series of maps of the Scottish counties, of the finest quality, the originals of which are preserved in the Advocates' Library, Edinburgh; the British Museum, London; and the Bodleian Library, Oxford. Other maps are known to have existed, but these, and a few of his "Sea Maps," are all that have come to light so far. These maps are, in almost every respect, models of workmanship, being clear, minute, and with an artistic effect in their appearance, quite different from the confused manuscripts of Timothy Pont.

But, on the other hand, the Register House papers reveal a not very satisfactory state of affairs for which there is no adequate explanation. Large sums of money were given to Adair from time to time, without any visible result being attained in the way of issuing the maps. From the Privy Council Records we know that in 1682 he got a subsidy of £100 a year, to enable him to complete a series of County Maps of Scotland which he projected, and although these were actually surveyed and drawn by 1686, it was not till long after Adair was dead that the chief maps were engraved and published.

As there is no public record of what Adair did, or was expected to do, to understand the earlier course of events between the Privy Council grant in 1682, and the Register House papers beginning 1691, we have to go to the maps themselves, and as they are nearly all dated, we can see the rapid progress made at this period. Assuming that he would begin at Edinburgh, and then do West Lothian (neither map is dated, nor is Clackmannan), the following is the list of manuscripts extant:—

Date.	Map.	Manuscript in
...	Midlothian	Advocates' Library.
...	West Lothian	Do.
...	Clackmannan	Do.
1682	East Lothian	Bodleian and Advocates' Library (less complete).[1]
1683	Forth	Do. do.
1683	Strathearn	Advocates' Library.
1684	East Fife	Do.
1685	Stirlingshire	British Museum and Advocates' Library (less complete).[1]
1686	Clyde Chart	Bodleian Library.
1686	West of Scotland	British Museum and Advocates' Library (less complete).[1]
...	Ettrick Forest	Advocates' Library.

[1] See note at end.

With the completion of these maps passes what might be called the most satisfactory period of Adair's life, and as the date of the last map came fairly near the political crisis of 1688, it is a natural inference that the advent of William and Mary brought about a new set of conditions, and in the process Adair was dropped and his work unsupported. Be that as it may, Adair was "ready to perish" for want of funds in 1686, and it was not till 1691 that help appears to have been given in some form. As already stated, it is not by any means clear in what relation Adair stood to the authorities, for all along he seems to have been working on the maps, but whether it was through having a little means of his own, or through the help of Sir Robert Sibbald, his patron—the Geographer Royal for Scotland—is so far quite unknown.

The Register House papers, however, contain a series of reports, in which Adair, having succeeded in interesting the authorities, informs a Commission, in 1692, that four maps are complete—The Water of Forth, the Water of Tay, the Water of Clyde, and St. Abb's Head to (?Sunderland Point); land maps of East Lothian, West Lothian, Middle Lothian; one of Stirlingshire and Menteith; one of Clackmannanshire; two of Fife and Kinross shire; one of Perthshire; one about Angus; one general map of Gallowayshire; one of Nithsdale and Renfrew;[1] and one particular map of Cunningham and Renfrew.

So satisfied were the Commission with his work, and with his proposals to go on with a series of "Sea Maps," that a tax of 4s. a ton was levied on all "foreign" shipping at the Scottish ports, and 1s. a ton on home shipping, the revenue to be collected and handed to Adair to prepare maps for the use of mariners. All was well so far.

But at this point a Captain Slezer—an Artillery officer, described as a "High German"—appears on the scene; says he is compiling a most important book relating to Scotland, with many pictures; asserts that his work is of equal national importance to Adair's; and claims a share of this tax. Without any reason being given, his claim is admitted; so that one can only imagine that, in the political changes of the time, Slezer had some Court influence through service rendered to William of Orange, and that for this reason his application was successful.

Thereupon ensued a continuous wrangle between Slezer and Adair, which lasted for many years. Adair would apply for a grant towards his expenses, and, getting some money, Slezer would immediately apply for his proportion, only to find that, as the funds were low, there was little for him. Then Adair applies for more money, pleads great poverty after heavy outlays, which, when Slezer hears of, he instantly urges the Commissioners not to pay Adair anything more, because he has not done what he undertook to do. After much wrangling, each gets something; but Slezer is never satisfied, while Adair's expenses are always increasing.

The unfortunate and inexplicable fact is that Slezer's statements seem perfectly true. We know that by 1686 Adair had drawn and

[1] This name, duplicated in the next map, is not lucid, as Nithsdale and Renfrew are not contiguous.

completed all his "Land Maps," for which he had drawn his salary, and yet they were never issued. He reports that in 1694 ten "Sea Maps" and ten "Land Maps" were finished, four others were almost ready, and still the Commission seem to be quite satisfied. But, alas, in 1695 he is no further forward, and in 1696 they are still not finished. In 1698 Adair gets another £600 [1] for a West Coast Survey, and yet, strange to say, the other maps still remained unpublished. Nevertheless, Adair gives a full list of his disbursements; explains that in 1692 he brought an engraver (Moxon) from Holland; in 1695 he says that Mr. Clark, the engraver, has finished several maps; in 1696 he has paid £110 [1] for engraving, £85 [1] for large copperplates, £92 [1] for polishing same, and still the Commission are satisfied, and Adair continues to get his money. Poor Slezer, on the other hand, is ignored, and his requests for money seem either to be held over, or granted only after persistent pleading. Apparently he is not a *persona grata*.

In the later papers the vituperations come to a climax, for Slezer roundly makes the charge against Adair to the Commissioners that he is no further forward in 1698 than he was in 1694, and that Adair is just inventing excuses for not completing the maps, in order to obtain more money.

In return for this, Adair informs the Commissioners that Slezer is an "illiterat stranger," gathering together a big volume of scraps "only to amaze" the country, attempting a work that would tax the ability of the most learned men in Scotland, and that most of the book consists of scraps from authors as unlearned as himself; that Slezer sits at home in comfort, while Adair in his surveying expeditions has been three times driven on shore by storms, and has had great hardships and perils.

At this period the Register House papers cease, but we know that in the end five maps of the East Coast were issued in a little Atlas in 1703, with descriptions by Adair, prefaced by a Map of Scotland. This latter was apparently copied from one issued a century previously by a French geographer, Nicolay, but no important changes were made in the outline of the less known North of Scotland, such as we would expect if Adair had surveyed the West Coast, as he claimed, for the outline of the Hebrides is not changed from that of Mercator of 1564. Only one of the maps in this atlas is dated, that of Montrose Harbour, by Clark, dated 1695.

As to the "Land Maps," three were engraved, Clackmannan (sent out to try to get subscriptions for the other maps, and very roughly engraved); Stirlingshire (Windings of the Forth), dated 1688, and engraved by Moll; Strathearn (undated), engraved by Moxon (whose work is mostly from 1675 to 1692). The other maps were not engraved, apparently, till long after Adair's death, and some have never been issued at all. The Map of Ettrick Forest in the list of manuscripts requires special attention, because in none of his lists does Adair ever mention this map, and from the title on it, and its resemblance to

[1] Presumably pounds Scots.

Gordon of Straloch's map of the same district, it would almost appear as if Adair had merely copied this map, for he makes no claim to have surveyed it. The Map of Strathearn referred to above is probably the Map of Perthshire referred to in the inventory of 1692.

The following is the list of printed maps by Adair. The first six appear in Adair's *Description of the Sea Coast*, a work which was intended to have been issued in several parts, but only the first was attempted.

1. Map of Scotland, based on Nicolay's Map of 1583: engraved by Moxon.
2. Holy Island to St. Abb's Head: engraved by Clark.
3. Forth, Queensferry to St. Abb's: no engraver named.
4. Tay: engraved by Clark.
5. Montrose and Bay: engraved by Clark, 1695.
6. Redhead to Aberdeen: engraved by Clark.

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7. Strathearn: engraved by Moxon.
8. Forth (Stirling and Menteith): engraved by Moll: dated 1688.
9. Clackmannanshire: no engraver named.
10. Map of Clyde, published 1731: engraved by Cooper.
11. Map of East Lothian: engraved by Cooper.
12. Map of Midlothian: engraved by Cooper.
13. Map of West Lothian: engraved by Cooper.
    (Cooper's work is mostly about 1730-42, but his name appears as late as 1753 as an engraver.)

These are all the published maps issued as Adair's, but in an Inventory of Maps in his widow's hands, a number of others relating to the West Coast are mentioned, and it would almost appear as if access had been obtained to these about 1710, for a change in the shape of the Hebrides appears on Moll's Map of Scotland (1714), as if a new geographer had made a survey.

Adair's maps of the Lothians were again used by Elphinstone in 1744 (engraved by Smith), but Andrew Millar appears to have got this plate, scraped out the title and engraver's name, and issued it in 1745, showing the Battle of Prestonpans, and with Kitchen's name small beside the title, as if he had engraved the map, whereas it could only be the title that was his. The two maps only differ in title, and in small details.

(It is, perhaps, opportune to mention that in 1739 the Rev. J. Jaffray surveyed the Peterhead coast, and thus continued Adair's work, the map being engraved by Cooper: in 1744 the Rev. A. Bryce surveyed the Pentland Firth and North Coast, and this map was also engraved by Cooper; while in 1750 Murdoch Mackenzie completed the survey of the Orkneys and Lewis, thus, with Adair's West Coast surveys, practically completing the best outline of Scotland that had been attained. The intervening portion of the Moray Firth was well surveyed for Collins's *Coasting Pilot*, 1693.)

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It is not easy to say exactly what was the sum of Adair's contribu-

tion to geographical science, for his maps, as a rule, do not show any lines of longitude or latitude. The marks up the margins are miles, not degrees, while he is credited with reckoning 72 miles, in place of the 50 or 60 of the older geographers and the modern $69\frac{1}{8}$ miles to a degree.

Looking to the character of his work, and the delicacy and beauty of the delineation of the original drawings, one imagines Adair must have been one of those painstaking, finical workers with the artistic temperament, to whom time was no object, and accuracy of detail of such importance that it was sought after, regardless of its actual value, or of any finality to putting on finishing touches. He spent ten months in Holland and London getting instruments, trying the engravers, and seeing their ways of printing maps. He paid £50 for a quadrant—at which Slezer scoffs; £72 for a sixteen-foot telescope; he goes to the Binn Hill above Kilsyth to calculate the joining of the East and West Coast maps; he spends six months in a fishing-boat surveying the West Coast; he takes a boat specially to find the bearing of a newly discovered rock between Inchkeith and the "Ledy Beacon." Then he buys copperplates in London, on which to engrave maps (probably old map plates), and pays Moxon £98 for the engraving only of the Map of Scotland ($11\frac{1}{2} \times 15\frac{1}{4}$) for his Atlas. He buys ten reams of Imperial paper at a cost of £300—probably £25 sterling—but where all these copperplates and paper went to is a mystery. He also bought a small rolling press—probably what we now call a copperplate press—and some printing presses, which latter would be presumably those wooden screw devices we see in the pictures of early printing houses.

Slezer, on the other hand, appears to have been a man of some push, with a fine appreciation of the elegant Dutch pictorial works, but with some traits that did not commend him to his superiors, for his pay of 12s. per diem, as an artillery officer, was reduced to 8s., and when he petitioned for it to be restored—seeing no other officer had been so dealt with—while his petition was granted, nominally, no instructions were given to pay it, so he had to take refuge in Holyrood Sanctuary from his pressing creditors.

With all these matters before us, what position can we say that Adair holds in the development of Scottish Geography? It would appear that his work was highly appreciated by the Commission of the time, yet, looking to the fact that so little was accomplished in the way of publication in his lifetime, there must have been some very serious drawback, which even Sir Robert Sibbald was unable to overcome, and to which we have no clue. For when one reviews the progress made from, say 1681 to 1686, compared with the indefinite results of the next twelve years, coupled with the fact that Sibbald appears to have dropped his patronage of Adair about 1688, and thereafter appears to have had no more to do with him, the impression is left on us that we are here dealing with one of those clever men who are disabled from doing great work by a physical inability to come to a decision to conclude their work—it is always waiting for still another detail to be perfected. It would almost seem as if Sibbald had trans-

ferred his patronage from Adair to the more pushful Slezer, probably because he was tired of Adair's methods and procrastination. All the work that Adair did was splendidly done, but one feels a sense of mystification, when one finds that after 1686 everything seems to have gone to pieces, for no really effective work, beyond the maps of Tay, Montrose, and Kincardine Coast (and apparently some West Coast maps), appears to have come from his hands in the next twenty-five years.

As to Adair's age, no details are known, but if we assume that the average man exhibits his best talents about the age of twenty-seven, and note that Adair's first work appears to have been finished about 1681, it might be fair to assume the date of his birth as about 1654-56. Then, as his best work was done by 1686—five years later—this would bring out that his county maps were drawn when he had reached thirty-two or so. The setting out to survey the West Coast in 1698 would bring us, on this reckoning, to the conclusion that he had reached forty-five, when he had passed his prime. Thus, when his Atlas was issued five years later, in 1703, he would be about fifty. We hear of him a little later, when an Act of tonnage for his benefit was made in 1705, but after that nothing is known of him, and he passes out of our ken as silently as he entered it. But for the fact that a payment was made to his widow in 1723, on her handing over the unpublished manuscripts which she had, the period of his death would have been absolutely unknown, and it is only inference that suggests that his death might have taken place in the previous year. There is, of course, as much likelihood that he might have died many years before, and that only necessity compelled his widow to part with the manuscripts, at the date given.

As to Adair's status in life, it is not easy to hazard a guess. He calls himself a "mathematician," and as he was admitted to the Royal Society (London) in 1688 (the entry in the Royal Society books gives no clue as to his qualifications), and as his disbursements in connection with his maps were on a fairly large scale before he got back his outlays, one cannot but think he was of good family and education, with a small income, sufficiently large to enable him to go on with his work, without thinking wholly of the remuneration, like Slezer. In the Canongate Register of Marriages, Jean Adair, daughter of John Adair, Geographer, was married to John Ramsay, writer, Edinburgh, on 30th July 1715, so that an entry of this kind testifies to some social standing. The name of Adair also seems to be associated with Wigtownshire, so that one would be inclined to look to that county for his early history.

There is one circumstance, generally overlooked, which must have had considerable effect on the prospect of his "Sea Maps" (though not his "Land Maps"), in the publication of Captain Grenvile Collins's *Coasting Pilot* in 1693. This splendid book of Maps of the Coast of Britain was begun in 1686, and Collins completed his work in seven years, and, even although the maps are not of such exquisite detail in Scotland as are those of Adair, the issue of fifty-three maps in seven years seems fine work, in comparison with Adair's eighteen or nineteen maps in twenty-five years. It is rather interesting to notice that

Moxon, Clark, and Moll, who were at work engraving Adair's maps, were employed by Collins in engraving the maps for his book also. There is no evidence that Collins used any of Adair's outline for his work, yet it must have had a deterring effect on the publication of a set of maps of the coast for Scotland only.

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In collating the above material, I have to express indebtedness for the very friendly assistance given by the Keepers of the British Museum, Bodleian Library, and Advocates' Library in affording every facility to photograph and study the maps, so that the one could be compared with the other, and the facts brought together.

Note on the Manuscripts in the Advocates' Library.

It will be noted that four of the manuscript maps are in duplicate, and in each case the Advocates' Library copy is less complete. The title is shorter, there is no dedication, and the outlines towards the edges are not filled in. At this stage it is impossible to say which is the original and which the copy, because the pin-marks indicate that the duplicate was reproduced by laying a completed map on the top of a blank sheet and pricking through the paper. The outline was then inked in between the pin marks. With the exception of Clackmannan and Midlothian, the watermark on the paper, an L, with a small loop at the top indicating a D or P, shows that the same paper has been used on all the manuscripts.

JAMES GEIKIE: HIS LIFE AND WORK.[1]

THE members of the Royal Scottish Geographical Society will welcome this brief but interesting memorial of the life and work of their former President, whose devotion to the interests of the Society, from its earliest inception, did so much to ensure its successful inauguration and its continued welfare.

In happier times we might have looked for a fuller account of James Geikie's many activities; yet, although the exigencies of war conditions have compelled condensation of their material, the authors have succeeded in bringing together within a comparatively few pages the leading facts of his life, and the essential features of his work as teacher and geologist.

For her description of his earlier years Dr. Newbigin has naturally been dependent upon the letters, diaries, and personal recollections placed at her disposal by the members of his family, and his old friends and colleagues. This material she has used with discrimination, and the portrait that she presents is life-like and appreciative. From his family history we learn that his musical and artistic tastes were derived from his father's family, while to his maternal grandfather, the adventurous sea captain, we may trace his love of travel and delight in the sea:—it is perhaps more than a coincidence that two of his sons are now

[1] *James Geikie: The Man and the Geologist.* By Marion I. Newbigin and J. S. Flett. Edinburgh: Oliver and Boyd, 1917. *Price 7s. 6d. net.*

wearing the uniform of His Majesty's Navy. The year 1861 was, possibly, the crisis of Geikie's career, when, at the age of twenty-two, he escaped from the uncongenial atmosphere and dull drudgery of a printing-office to join the Geological Survey, and entered upon what were to prove the happiest years of his life. The free, roving existence, much of it passed among the beautiful scenery of the Borders, and the friendly intercourse with men of every degree, appealed to many sides of his personality, while the unrivalled opportunities of first-hand observation led to the accumulation of a store of facts, to bear fruit later in his masterly exposition of the glacial history of Scotland.

Miss Newbigin outlines the course of his labours in Ayrshire, Lanarkshire, and the Border counties, and recounts a few of the humorous experiences he met with in his wanderings. She also refers to his great powers of work during his middle years, when, in addition to his official duties, he was preparing the volumes that were to bring him fame.

In 1882 he was called upon to face the question of exchanging the free, open-air life of the Survey for the closer atmosphere of a University class-room. The decision, for many reasons, was a difficult one, and cost him much anxiety, but the choice once made, Geikie threw himself with characteristic energy into this new field of activity, with the result that the thirty-two years of his tenure of the Chair of Geology saw a great advance in the methods of geological teaching and in the popularity of the subject among the students.

Unlike some men of science, whose devotion to their chosen subject seems to narrow their field of interest, James Geikie's outlook on life was broad and sympathetic. Apart from his remarkable knowledge of the literature, native and foreign, bearing on his special studies, he was a man of wide and varied reading, and his love for and close acquaintance with all that is best in English prose and poetry are reflected in the lucidity and precision of his style. He held strongly that scientific facts should be presented in the clearest and most literary English at the writer's command, and often expressed his abhorrence of the slovenly methods of too many of our scientific writers.

Of strong personality and vivid imagination; nervous and quick-tempered, but by nature genial and warm-hearted; staunch in friendship and formidable in controversy, James Geikie was one of those of whom it may well be said,

> "He warmed both hands before the fires of life,"

and brought keen powers of enjoyment to every happy chance of social and intellectual intercourse that crossed his path. As Miss Newbigin has happily phrased it:

> "He gave freely—to the world of his labours, to his intimates of his affection, and he received much—honour from his fellows, and, what he prized more, the love of those who knew the real man beneath the northern shyness and reserve.
>
> "All is transitory—his conclusions may be disputed, new lights may be thrown on problems which seemed to him conclusively solved; but the

nation which can produce such men can never be poor, and his uprightness, steadfastness, and simplicity of character enabled him to leave an abiding imprint upon his day and generation."

The second part of the volume is devoted to an excellent, though necessarily somewhat condensed, account of Geikie's geological work from the pen of Dr. Flett, himself a former University assistant of the Professor. Dr. Flett sketches the rise and progress of the study of glacial geology in Scotland, and points out that Charles Maclaren and Robert Chambers, both Edinburgh men, were among the first to follow Agassiz in attributing the drifts, striated surfaces, and carried boulders of this country to the action of land rather than of floating ice.

On the appearance of the *Great Ice Age* James Geikie was "immediately accorded the place of protagonist in the cause," and his views as to the dominance of glacier ice over that of icebergs soon met with general acceptance.

Dr. Flett lays stress on the influence of Andrew Ramsay, "a man after his own heart," upon Geikie's work, and regards the latter "as the direct successor of Ramsay in the line of scientific thought." The views of another old Survey colleague, James Croll, author of *Climate and Time*, as to the cause of the Glacial Period were fully accepted by Geikie; and, although in later years Croll's theory was subjected to destructive criticism, Geikie made it clear "that, in his opinion, if Croll's hypothesis failed, no other explanation could be regarded as adequate." In the first edition of his *Great Ice Age* he had adumbrated his belief in the alternation of warm and cold phases during the Glacial Period. In the later editions of that work and in his *Prehistoric Europe*, he took up a bolder attitude, elaborating his views and supporting his position with evidence drawn from regions furth of Scotland. But the doctrine of inter-glacial periods, in the extreme form advocated by Geikie, was to prove a fertile source of controversy, and the long-drawn battle between inter- and mono-glacialists still rages.

Be the result of this battle what it may, there can be no dispute as to the permanent value of the general principles set forth in his writings, and he will always be recognised as having laid the foundations for the accurate and systematic study of glacial conditions in this and other lands.

The volume is illustrated with four portraits taken at different times of his life. Of these, that facing page 116, from a photograph in the year 1899, is perhaps that which recalls the genial Professor as one likes best to remember him.

LIONEL W. HINXMAN.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

MEETING OF COUNCIL.

At a meeting of Council held on January 4th the Diploma of Fellowship was conferred upon Mr. William Mackay and upon Mr.

Charles Matheson, M.A., author of the volume on *Moray and Nairn* in the Cambridge Series of County Geographies.

Lectures in February.

On Thursday, February 28th, Mr. S. G. Cheng will lecture in the Synod Hall, Edinburgh, on "China's Geography: Historical and Social," at 4.30 P.M.

Afternoon Lectures.—The following afternoon lectures will be delivered during February in the Hall of the Royal Society, 24 George Street, at 4.30 P.M.:—February 7, Dr. Marion Newbigin, "Alsace-Lorraine"; February 21, Mr. George G. Chisholm, "The Economic Geography of the Western Front."

GEOGRAPHICAL NOTES.

Europe.

Alsace-Lorraine.—We have received from the "Ligue Patriotique des Alsaciens Lorrains," 18 Green Street, Leicester Square, London, W.C.2, two pamphlets on Alsace-Lorraine, and a communication to the effect that the League, of which Lord Balfour of Burleigh is the Honorary President, will supply lecturers and speakers, free of fees, to address meetings. One of the two pamphlets is entitled *The Question of Alsace-Lorraine*, and gives a succinct historical account of the subject. It may be recommended as giving the essentials of the problem in convenient form. We note two interesting German quotations which may be reproduced here. On May 20, 1871, Treitschke declared that the day would come when the Alsatian peasant from the remotest village of the Vosges would exclaim—"Oh, the happiness and joy of being a citizen of the Empire!" But forty-two years later, after the Saverne incident, Herr von Jagow said concisely—"In Alsace-Lorraine German troops are in enemy country."

Another interesting quotation is given from the *Rhenish Westphalian Gazette*, the organ of Krupp's works. This states that while Alsace-Lorraine was originally annexed on account of its strategic importance, it is now of value to Germany because of (1) the petroleum of Pechelbronn in Lower Alsace, which has proved of considerable use during the present war; (2) the potash of Upper Alsace, of importance in the manufacture of munitions; (3) the iron of Lorraine. In regard to the last point it is said "that we cannot think without terror of what would have happened to us had not the mines of Lorraine been in our possession."

America.

British Guiana.—Steps are being taken in this Colony with a view to the opening-up of the pasture lands of the interior as a cattle-grazing country. Hitherto in the colony development has been almost confined

to the coastal belt, where sugar-cane—the predominant crop—is extensively grown on the empoldered lands of the former swamps. That the savannas of the interior are suited to live stock has long been known, but the difficulties of communication have prevented their development on any scale. The desirability of a railway line to the interior has often been urged, but this line must wait till after the war. Meantime an expenditure of £12,000 has been authorised for the establishment of a cattle trail. This is to lead from the Berbice river, on which New Amsterdam stands, to the savannas bordering on Brazil. It is to be cut through 120 miles of jungle, and is to have a general width of 32 feet. On its course corrals, cattle enclosures, rest-houses, and so forth are to be provided, with two punts and a launch for the crossing of the Essequibo river. The trail will shorten the time of transit from the interior to the coast from a month to a week, and it is hoped that the work may be completed early this year. There are already 35,000 head of cattle in the district which will be opened up, and it is estimated that these herds will supply 1000 cattle annually for export, while a great increase in the number of the animals is perfectly feasible. In addition, there are 150,000 head of cattle in the Brazilian savannas across the frontier, for which the new trail will also provide an outlet. At present the export trade of this region has to reach the coast by way of Manaos.

General.

The Scottish Meteorological Society.—The general meeting of this Society was held in Edinburgh on December 20. It was stated at the meeting that monthly and annual rainfall figures are available for fully 750 stations in Scotland. The Society has at present 261 members, of whom 81 are life members. The present President of the Society is Professor R. A. Sampson, the Hon. Secretary Dr. E. M. Wedderburn, and the Hon. Treasurer Mr. W. B. Wilson.

Economic Geography.

Economic Relations between France and Spain.—During the war period efforts have been made, on both sides of the frontier, to improve the relations between France and Spain. As a part of this campaign the Institute of France sent a Commission, including representatives of the scientific, industrial, and commercial world, to Spain in November last. This Commission included M. Charles Lallemand, who gives an account in *La Géographie* for September of the experiences and conclusions of the party. Two points of special interest are noted in his article. One is the possible development in the future of a trade in coal between France and Spain. France, as was recently emphasised here, does not produce sufficient coal for her own needs, and before the war imported a considerable amount from Germany. Now there seems reason to believe that in Asturias there occur large deposits of coal of good quality, within easy reach of the port of Musel, recently constructed at Gijon. The product could thus probably be exported at a cheap rate

from this port to Bayonne, Bordeaux, and generally to the south-western region of France.

The other point is in regard to the Spanish railway system. As is well known, Spain suffers much in her intercourse with the rest of Europe from the fact that her railways are of a different gauge than those of continental Europe generally. The proposal that this should be corrected throughout the peninsula has often been made, but it would involve heavy outlay. M. Lallemand suggests that, pending any elaborate scheme, it might be at least possible to facilitate access from France to the towns of Barcelona and Saragossa. Two new tunnels have recently been cut, one at each end of the chain of the Pyrenees, to accelerate the connection between these towns and the French railway system. He suggests that it might be possible, in view of these new tunnels, to continue the European railway system at least to these two towns, and thus obviate the necessity for detrainment in reaching them from France, and this for both passengers and goods. If, further, Bilbao and Hendaye could be similarly connected, the whole of the north of Spain—that is, its most industrialised part—would have quick and effective connection with the rest of continental Europe. It is hoped that the carrying out of such a scheme may be one of the results of the visits of the Commission.

The Forests of Russia.—In *La Nature* for December 1, M. Charles Rabot presents a series of figures in regard to the forested areas of Russia in Europe and in Asia, leading up to the conclusion that Russia is able to pay the expenses of the war out of the value of her timber alone. The forested area, when that of Siberia is included, is immense, being estimated at not less than 516 million hectares (one hectare = about 2½ acres), or nine and a half times the total area of France. Even before the war the Russian export of timber already exceeded that of North America and the Scandinavian States. In 1811 its exports stood at 1,861,000 standards, as against 1,670,000 for Canada and the States, and 1,079,000 for Norway and Sweden. When the possibility of a great post-bellum increase is considered, however, one finds that in this as in many other respects, Russia's apparent wealth is far from being wholly realisable. Siberia is estimated to contain 320 million hectares of wood, but relatively little of this can be exploited owing to the difficulties connected with its export. Even the conversion into wood pulp is scarcely feasible, in view of the general absence of water-power in the country. There still remains, however, the vast coniferous forest of northern European Russia, estimated at 108 million hectares, or twice the area of France. Here exploitation is relatively easy by means of the great rivers, and M. Rabot lays special stress upon the woods of the Petchora region, and the opportunities which that river offers for export.

The subject was also discussed by Mr. Stebbing, in his recent lecture to the Society, on the basis of a personal visit. This lecture will be printed in a later issue of the *Magazine*.

NEW BOOKS.

EUROPE.

Real Russians. By Sonia E. Howe. London: Sampson Low, Marston and Co., Ltd., 1917. *Price* 6*s. net.*

The author, the wife of an English clergyman, went to Russia in the summer of 1916, in order to plead with the authorities the cause of the administrative exiles—that is to say, the persons sent into exile without trial, on suspicion of holding undesirable political opinions. In this venture she had some measure of success at the time, and the promise of a much wider remission of sentences. But in all probability it needed the cataclysm of 1917 to realise the fulness of her aim, and it is through it that she is enabled to dedicate her book "to all Russian political exiles, now happily free."

Incidentally, while in Russia, Mrs. Howe was able to be of service to the large numbers of soldiers who had escaped from prison camps in Germany. These men had simply been overlooked by their military authorities, an instance of the terrible lack of organisation which prevailed. The stories of torture brought back by them from their confinement—torture not only physical but mental, such as seeing their home letters flung into a furnace instead of delivered to them—have banished the glamour that all things German formerly had in the eyes of the people.

In the course of her errand of mercy Mrs. Howe had interviews with the Russian Prime Minister and many other persons in power. She, however, scornfully refused to meet the monk Rasputin, then at the height of his noxious influence, and showed a determination and aplomb which proved her an admirable envoy. But to the general reader the value of the book consists in the vivid but uncoloured sketches of the people and country as she saw them. Herself of Russian birth, she could mingle freely with the peasants and discuss their circumstances and views. She was able to realise the benefits resulting from the abolition of vodka, the universal expectation of great things coming to the people after the war, their present helplessness, the "rings" and "corners" which were the curse of the country. Mrs. Howe visited several hospitals, including the Anglo-Russian Hospital in Petrograd, the chief depôt of the Red Cross, a magnificent institution, also some of the world-famous shrines and monasteries. She shows intense appreciation of the beauty of the forests and country scenes of her native land, and those persons who are unable to contemplate a trip to Russia in the meantime—and they are many—will find much intimate information in her pages. The illustrations are well selected.

British Rainfall, 1916. *On the Distribution of Rain in Space and Time over the British Isles during the year* 1916. By Hugh Robert Mill, Director, and Carle Salter, Assistant Director, of the British Rainfall Organisation. London: Edward Stanford, 1917. *Price* 10*s.*

This, the fifty-sixth annual volume, appeared somewhat later than usual, and in slightly reduced size, but these are the only apparent effects of the war, a result upon which the Director and his staff are to be warmly congratulated. The number of returns included is practically 5200, the reduction being only 4 per cent. as compared with the previous year, and the difficulties incident upon reduced income and the loss of all assistants of military age have been successfully overcome. All plans for improvement or extension of the scope of the work have necessarily had to be postponed, but both the scientific world and the public at large should be grateful to Dr. Mill and his assistants for their unremitting labours,

and for the skill and patience with which they have met the obstacles due to present conditions. It is, as the Director remarks in his annual report, "a marvellous thing that the work has survived three years of war distractions and restrictions," and we extend to the volume a hearty welcome.

Trois Aspects de la Révolution russe. Par Émile Vandervelde. Paris: Berger-Levrault, 1918. *Prix*, 2 *fr.* 50 *c.*

M. Vandervelde was a member of a party of three Belgian Socialists who paid a visit to Russia during the period May 7—June 25 last year. About a fortnight was spent in Petrograd, another at the front, while M. Vandervelde and one companion also visited Moscow. The "three aspects" of the title refer to the fact that the book discusses the Revolution from the industrial, political, and military points of view. Since the time of the visit both the military and political situation have undergone great changes, so that these sections have now largely a historical interest. The discussion of the effect of the revolution on industry, on the other hand, seems to us to contain much that is fresh, and we shall speak chiefly of this part of the book.

M. Vandervelde repeats, in the first instance, the usual statement that Russia is predominantly agricultural. He gives the percentage of the population which depends upon the cultivation of the land or the exploitation of the forests for a livelihood as 85 of the total. But he proceeds to emphasise a point which is probably much less familiar. This is that, despite the small total of factory workers, the factories themselves tend to be large, exceedingly well-appointed and up-to-date, and, an important point, are as a rule under the control of foreign managers and foremen. He does not mention, what we believe to be the case, that the capital is also chiefly foreign. The presence, especially in Petrograd, of these large modern establishments introduces a strong western note into the orientalism of Russia. Further, the workmen of these factories are recruited, especially since the war, from all parts of the vast empire, and are for the most part peasants who have but recently left the land. This condition has been greatly accentuated since the outbreak of the war by the removal of most of the skilled and experienced workmen, who have been drafted into the artillery or into other branches where their special skill and experience are valuable. The newcomers who have taken their place have no experience of political liberty, and very little even of trade organisation. Under the old régime trade unions were discouraged in every possible way, and though, since October 1905 they have no longer been absolutely prohibited, yet every obstacle has been put in the way of their development.

Finally, the natural leaders, of the workmen no less than of the other sections of the community, were, under the old government, either exiled or compelled to expatriate themselves to avoid this fate. The latter section, in Switzerland especially, but in other parts of the western world also, were not only out of direct touch with Russian conditions, but from the nature of the case were thrown chiefly into the society of "advanced" thinkers of other nationalities. Upon them the Social Democracy of Germany especially has exercised a profound influence. All these facts M. Vandervelde clearly recognises, and, rather by implication than by direct statement, for he speaks throughout as a Socialist and sympathiser with the Revolution, he admits that they have had unfortunate consequences. One of these, as he points out, is that the workmen and their representatives have everywhere seized power without recognising responsibility, and, from want of political training, have misused that power.

The account given suggests that it is hardly a paradox to say that the Russian

revolution is in part the long-expected German revolution, which has thus taken place, as it were, extra-territorially. In other words, the watchwords of the leaders, the conditions against which they are reacting, are not Russian but western. M. Vandervelde himself states that the last word must be with the Russian peasant, and it seems as if we may in the future have to regard the early stages of the revolution, especially in its industrial aspects, as merely an interlude, the necessary pause before the curtain goes up for the real drama, still preparing behind the scenes. But that this interlude may be disastrous to the nascent industries of Russia appears even through M. Vandervelde's carefully turned and veiled phrases. His book, as will appear from the above account, is one of much significance, and deserves careful consideration even by those who do not share his views.

In regard to the section of the book devoted to the army, we shall mention one point only. The party visited the occupied part of Galicia, and discovered, much to their astonishment, that, despite the fact that the area had been successively overrun by the opposing armies, food was abundant, war devastation insignificant, and, most surprising of all, the greater part of the adult, indigenous male population was in peaceful occupation of the land, or carrying on its usual avocations in the few towns. The Russian occupation here is stated to have been of extreme mildness; not only were all the old Austrian emblems left, but some of the townspeople openly expressed pro-Austrian sentiments, even in the presence of Russian troops. The presence of the men was explained by the fact that many Austrian troops surrendered on condition that they were allowed to return to their fields, as these were invaded by the Russians. The abundance of food was due to the fact that agriculture was going on as usual, and that as export into Russia was impossible on account of transport difficulties, and into Austria owing to the trenches, all food produced had to be locally consumed. The army of occupation was at the time of the visit only large enough to raise prices, without affecting the supplies available for the civilian population. M. Vandervelde states that the bulk of the rural population seemed "uninterested" in the war, accepting the alternate Austrian and Russian occupations with philosophy, and concerned only with local affairs. The Jews and Germans of the towns seemed to him anti-Russian and pro-Austrian. The facts are worth note, for it is possible that among the relatively unorganised populations of Eastern Europe this indifference to political destiny, except in so far as it directly affects local affairs, is more widely spread than theorists are willing to admit. It is obvious that it must introduce difficulties in connection with the "principle of self-determination" of which so much is now being heard.

ASIA.

The Village Gods of South India. By the Right Reverend Henry Whitehead, D.D., Bishop of Madras. Oxford: Humphrey Milford, 1916. *Price* 2*s.* 6*d.*

This is one of a series of small books to be devoted to the Religious Life of India, and gives an interesting account of a decaying cult. The volume contains a number of striking illustrations, a glossary of Indian terms, an index of the gods, a geographical index, and a general index. It is well got up, is arranged in a clear and simple fashion, and the series as a whole should fulfil its purpose of giving the general public here an idea of the salient features of Indian religious life, and thus promoting a fuller understanding of the peoples of that country.

The author brings out clearly that the worship of the village gods is both very ancient and is now in a state of decay. The original Dravidian inhabitants of

India dwelt in small agricultural and pastoral communities, and each community seems to have had its own god. These gods, in the form in which they now exist, differ very notably from those of the Hindu pantheon. Thus, with few exceptions, they are female, not male like the chief Hindu gods; they are worshipped with animal sacrifices, and they have no special sacerdotal caste associated with them. It seems probable that originally, *i.e.* before the Aryan invasion, the village gods not only protected their worshippers from harm, but had associated with them a cult whose object was to promote animal and vegetable fertility, and that the animal sacrifices especially had this object. Under the competition of the Hindu divinities and cult, however, the older gods and the older cult have lost importance, and the village gods are now called upon chiefly in times of plague and pestilence affecting man or beast. The process of decay is indicated by the variations in the festivals and forms of worship in the different localities. In some villages daily offerings of rice, fruit, and flowers, with incense and camphor, are still made at the shrine of the local god. In many there is a fixed annual festival, sometimes assuming the character of a harvest festival. In most places, however, there is no regular annual festival, sacrifices only being offered when an epidemic occurs. Old men in some villages are stated to have complained to the author that, owing to the decay of religion, the annual sacrifices had given place to one offered only every four or five years. In other words, it would appear that despite the popularity of the great Hindu deities, Siva and Vishnu, the cult of the older local god still lingers, and is always apt to be revived in a time of calamity.

Very detailed accounts of the modes of worship practised in the different parts of South India are given, and those interested in primitive religion will find much valuable material in the book.

AMERICA.

The Andes of Southern Peru. By Isaiah Bowman, Director of the American Geographical Society. Published for the American Geographical Society, New York, by Henry Holt and Co., 1916. With Maps and Illustrations.

This handsome volume gives an account of part of the geographical work of the Yale Peruvian Expedition of 1911, which was essentially a reconnaissance of the Peruvian Andes along the 73rd meridian. The author's division of the Expedition undertook to make a contour map of the 200-mile stretch of mountain country between Abancay and the Pacific Coast. This was an extremely laborious and difficult undertaking, and many of the triangulation stations ranged from 14,000 to nearly 18,000 feet in elevation, where the cold and hailstorms were most severe at times.

The First Part deals with the Human Geography of the region, including the author's travels in the cañons of the Urubamba, and describes the wonderful scenery and the various peoples in the different climatic zones from the coast to the snowline. In the lower tropical forests rubber is produced from the wild tree, and a chapter is devoted to its cultivation and to the hard lot of the natives, who live in a state of peonage here, as in other Spanish-American republics. "In South America there has lingered from the old slave-holding days down to the present a labour system more insidious than slavery, yet no less revolting in its details, and infinitely more difficult to stamp out. It is called peonage; it should be called slavery. In Bolivia, Peru, and Brazil it flourishes now as it ever did in the fruitful soil of the interior provinces, where law and order are bywords, and where the scarcity of workmen will long impel men to enslave labour when they cannot employ it" (p. 25). The horrible system by which the poor Indians are

enslaved and made by the lash to work on the rubber concessions, far from home and freedom, is described at length. When a man buys a rubber concession from the Government he buys a kingdom, and often the concessionnaire is himself the chief magistrate of his little kingdom, so that if he is a brute his subjects can have no redress for their treatment at his hands. The rubber producer, remote from all civilising influences, is often a lawless character or a downright criminal, and there is no means of supervising him by the weak and unintelligent Government. When the author visited the rubber districts the commodity was selling in London at about ten shillings a pound, but since then, owing to the scientific cultivation of the rubber tree in the East, mainly by British enterprise, the price has fallen to less than 2s. 6d., so that it is doubtful if the wild Peruvian rubber, even with slave labour, can be produced in the future so as to compete with the British-grown article.

There are, of course, good as well as bad owners, but they appear to be decidedly the exceptions. The Government is eager to secure foreign capital, but the country is hardly opened up, and the natural resources are for the most part almost inaccessible. The inducement for outsiders to invest in Peruvian development is therefore small, especially as there is everywhere a great scarcity of labour for all kinds of industry, the whole population being less than 1 per square mile.

The Forest Indians, the Country of the Shepherds on the higher slopes above the tree line, the Climatology and Meteorology, are described and discussed in separate chapters.

Part II. deals with the Physiography of the Peruvian Andes from the coastal desert up to the glaciers and glacial moraines of the Ice Age on the higher valleys. The volume is illustrated with many fine photographs of the grand scenery of the Andes, but a general key map of Peru would have been an advantage to such an important geographical work.

GENERAL.

La Question d'Orient, depuis ses Origines jusqu'à nos Jours. Par EDOUARD DRIAULT. Sixième édition. Paris : Félix Alcan, 1914. *Prix* 7 *francs.*

A copy of this edition has just reached us, though, as the date shows, it was published more than three years ago. The book was then revised in order to include the events of the Balkan wars, and, though the situation has undergone many changes since, it is of great value as a presentation of the facts of the great Eastern question up to the date named.

EDUCATIONAL.

The Senior Geography. By A. J. HERBERTSON and F. D. HERBERTSON. Fourth Edition, revised by O. J. R. HOWARTH. Oxford : At the Clarendon Press, 1916. *Price* 2*s.* 6*d.*

This volume of the Oxford Geographies has been revised by Mr. Howarth, and a number of new maps have been added. The illustrations are now very numerous, reaching a total of well over one hundred. Some of them are exceedingly clear, but perhaps the majority suffer from a tendency to overcrowding, more facts being often included than can be adequately set forth in the space available and with the means adopted. It is, we think, desirable that simplicity should be the first aim in such text illustrations, the scholar being referred to the atlas for all details.

Mr. Howarth states in his preface that the present edition has been brought

up to date as far as possible, having regard to the present political upheaval. The additions seem, for the most part, to deal with railway extensions, though a brief summary account is given of the changes in the Balkan peninsula as a result of the Balkan wars. Professor Herbertson's amended division of the world according to Natural Regions is included in the volume.

Glancing at the book as a whole, more especially with a view to existing conditions, one is struck both by the enormous mass of material dealt with and by the omissions. The late Dr. Herbertson exercised a profound influence on geographical teaching in this country in the period prior to the war, and it is much to be regretted that he was taken from us before the period of reconstruction began. By his personal influence and his great powers of organisation he did much to establish geographical teaching on a firm basis in this country; but he himself would have been the last to claim that his text-books represented the last word. Many of the boys who used his books in the earlier days when they were still new must now be fighting in France and Flanders, or in Macedonia, Palestine, or Mesopotamia. Even those of them who worked carefully and conscientiously through the senior volume, and thus acquired an enormous amount of detailed information, must find that their school geographical knowledge did little to prepare them for the problems which are facing the world to-day. The Berlin-Baghdad railway, the political destiny of Syria and of the Balkan peninsula, the questions associated with the future of Russia, the possibility of a reconstituted Poland, the control of the Adriatic, the significance of the position of the iron and coal fields on the Franco-German borderlands—all subjects of profound and pressing interest, are at most only touched upon. It is, of course, not to be expected that they could be discussed in a pre-war book in the form in which they now present themselves, but one is struck by the fact that their existence as problems scarcely emerges from the mass of detail in the book, and that from that mass of detail facts now known to thousands of homes are wholly omitted. Will geographical teaching after the war continue along the old lines, or will there be a change, a deliberate selection of essentials, a relegation of much to books of reference and atlas maps? We do not yet know, but it seems worth while to raise the question here, for it is one to which teachers will have to give their earnest attention at an early date. Even those most deeply conscious of their debt to the late Professor Herbertson will feel that they do most honour to his memory by giving it fresh and unbiassed consideration. .

BOOKS RECEIVED.

An Old Gate of England: Rye, Romney Marsh, and the Western Cinque Ports. By A. G. Bradley. With many Illustrations by Marian E. G. Bradley. Crown 8vo. Pp. ix + 374. London: Robert Scott, 1918. *Price 6s. net*

Through the Russian Revolution. By Claude Anet. Notes of an Eye-Witness from 12th March-30th May. Illustrated by 34 Photographs. Crown 8vo. Pp. viii + 252. London: Hutchinson and Co., 1917. *Price 6s.*

(This is a translation of the French book whose receipt was noted on p. 40.)

Hill Views from Aberdeen. With Articles, Maps, Diagrams, and Scientific Notes. By G. Gordon Jenkins, M.Inst.C.E. Demy 8vo. Pp. vii + 39. Aberdeen: D. Wyllie and Son, 1917.

Trois Aspects de la Révolution russe, 7 mai-25 juin 1917. By Émile Vandervelde. Crown 8vo. Pp. xvi + 202. Paris: Berger-Levrault, 1918. *Price 2 fr. 50 c.*

Northern California, Oregon, and the Sandwich Islands. By CHARLES NORDHOFF. Small royal 8vo. Pp. 256. New York: Harper and Brothers, 1874. Presented by JAMES MACALISTER, Esq.

Introductory Geography. By H. CLIVE BARNARD, M.A., B.Litt. Containing one Coloured Map and sixty-seven Illustrations, Maps, and Diagrams in Black and White. Crown 8vo. Pp. iv + 154. London: A. and C. Black, Ltd., 1917. *Price* 1*s.* 8*d.*

The War and the Future. By the Right Hon. Sir ROBERT BORDEN. Being a Narrative compiled from Speeches delivered at various Periods of the War in Canada, the United States, and Great Britain. With an Introductory Letter to the Compiler, PERCY HURD. Crown 8vo. Pp. xxiv + 164. London: Hodder and Stoughton, 1917. *Price* 2*s. net.*

Scottish Mothers and Children. Being Report on the Physical Welfare of Mothers and Children. Scotland. Vol. III. By W. LESLIE MACKENZIE, M.A., LL.D., M.D., D.P.H., F.R.C.P.E., F.R.S.E., Medical Member of the Local Government Board for Scotland. Royal 8vo. Pp. xxviii + 625. With two Maps in Colour and many Illustrations. The Carnegie United Kingdom Trust, East Port, Dunfermline, 1917.

Principales Cartes d'Ensemble à l'Échelle du Millionième ou à des Échelles Voisines. Par Louis Raveneau. Paris, 1917.

Genetic Classification of Underground Volatile Agents. By REGINALD A. DALY. Reprinted from *Economic Geology*, Vol. XII., No. 6, September 1917.

The Eastern Iron Trade of the Roman Empire. By WILFRED H. SCHOFF. Reprinted from the *Journal of the American Oriental Society*, Vol. XXXV., Part III., December 1915.

Colonial Reports (Annual).—Cyprus (941); Grenada (942); Jamaica (943).

Statistical Abstract relating to British India from 1905-6 to 1914-15. London. *Price* 1*s.* 6*d. net.*

Thirty-first Annual Report of the Bureau of American Technology, 1909-10. Washington, 1916.

Report on the Administration of Delhi Province for the Year 1916-1917. Delhi. *Price, Rs.* 2.

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

NEW MAPS.

EUROPE.

ORDNANCE SURVEY OF SCOTLAND.—The following publications were issued from 1st July to 30th September 1917:—

Six-inch and larger Scale Maps. 1:2500 Scale Maps (revised), with houses stippled and with areas. Price 3s. each. *Dumbartonshire* (Det.).—Sheet 29—11. **Stirlingshire.*—Sheets **N 10**—15; **N 15**—8, 10; **N 16**—3, 5, 6, 9; **N 17**—9, 12, 14; **N 21**—2; **N 22**—2, 7, 8, 16; **N 23**—1, 6, 14; **N 29**—1, 2, 11; **N 30**—5, 6, 11; **N 35**—4. *Revised on new meridian, the plan numerals therefore differ from those of the previous Revision.

Note.—There are no coloured editions of these Sheets, and the unrevised impressions have been withdrawn from sale.

GEOLOGICAL SURVEY OF GREAT BRITAIN.—The following publication was issued from 1st to 31st October 1917 :—

Memoirs of the Geological Survey.—Summary of Progress of the Geological Survey of Great Britain and the Museum of Practical Geology for 1916. Price 1s. 6d.

GEOLOGICAL SURVEY OF SCOTLAND.—The following publications were issued from 1st to 31st October 1917 :—

Memoirs of the Geological Survey.—The Economic Geology of the Central Coalfield of Scotland.

Description of Area II.—Including the Districts of Denny and Plean ; Bankнock ; Carron and Grangemouth ; Cumbernauld ; Castlecary and Bonnybridge ; Falkirk and Slamannan ; by L. W. Hinxman, B.A., F.R.S.E., C. B. Crampton, M.B., C.M., E. M. Anderson, M.A., B.Sc., and M. Macgregor, M.A., B.Sc. ; with Contributions by the late C. T. Clough, LL.D., F.R.S.E. Price 4s. 6d.

ADMIRALTY CHART, SCOTLAND.

Plans in the Firth of Forth.—Granton Harbour, Leith Docks, Grangemouth Docks. New edition, 1917. No. 3724. Price 2s.

Admiralty Office, London.

BARTHOLOMEW'S POCKET PLAN OF GLASGOW AND SUBURBS.—Scale 5 inches to a mile. Coloured, with Index. New edition, 1918. Price 1s. net ; mounted on cloth, 2s. 6d. net. *John Bartholomew and Co., Edinburgh.*

WINDERMERE AND MORECAMBE BAY.—Bartholomew's Reduced Survey Map on scale of 1 inch to a mile. Orographical colouring. New edition, 1918. Price 1s. 6d. net ; mounted on cloth, 2s. 6d. net.

John Bartholomew and Co., Edinburgh.

ADMIRALTY CHARTS, BALTIC SEA.

Baltic Sea, Eastern Sheet.—New edition, 1917. No. 28426. Price 5s.

Gulf of Finland.—New edition, 1916. No. 2191. Price 4s.

Gulf of Riga, Entrance.—New edition, 1916. No. 2263. Price 3s.

Admiralty Office, London.

EUROPEAN WAR MAPS.

Stanford's Half-inch Map of the Battle Front.—Valenciennes, Maubeuge, Avesnes. Sheet 22. Orographical colouring. 1917. Price 3s.

Edward Stanford, Ltd., London.

This is another of the excellent series of maps of the Western Front.

The Western Front at a Glance.—A large-scale atlas of the Allies' Fighting Line in the West. Scale half an inch to the mile. 48 pages of Maps, with Index. 1917. Price 1s. 3d. net.

George Philip and Son, Ltd., London.

A very handy, useful, and clearly printed little atlas. See also review, p. 37.

ASIA.

PALESTINE.—Scale 1 : 168,960, or three-eighths inch to 1 mile. Engraved at Stanford's Geographical Establishment from surveys conducted for the Committee of the Palestine Exploration Fund, by Lieutenants C. R. Conder and K. K. Kitchener, R.E., 1881. Printed, with addition and corrections at the War Office, 1916. In 2 sheets, "North" and "South." Price 7s. 6d. unmounted ; mounted to fold, 15s ; mounted on rollers, 15s.

Geographical Section, General Staff, London, and Palestine Exploration Fund Office, London.

This is a new popular edition of the reduced map of Western Palestine issued by the Palestine Exploration Fund. It shows all the roads and railways constructed since the original survey was made. Only modern place-names are given, the Biblical identifications having been omitted for the sake of clearness. The hills are printed in brown, which also contributes to the legibility of the map.

PALESTINE.—Bartholomew's Topographical and Physical Map. Scale 4 miles to an inch. Compiled from the Palestine Exploration Fund Surveys and other authorities, with additions to 1917. Inset Plan of Jerusalem, Vegetation Map, and Sections. In 2 sheets. Price 8s. 6d. net, mounted on cloth and folded. Mounted on rollers, 15s.

John Bartholomew and Co., Edinburgh.

The area included in this map extends from Beirut in the north to beyond Beersheba in the south, and from Gaza in the west to beyond Damascus in the east. The orographical contour colouring brings out the relief of the country with striking effect. Biblical as well as modern names are given.

PALESTINE.—War Map. Scale 1 : 684,288, or 8 miles to an inch. 1917. Price 2s. 6d. *Edward Stanford, Ltd., London.*

This is a handy map for reference, but the names are somewhat obscured by the black hill-shading.

AMERICA AND AUSTRALIA.

MANITOBA AND SASKATCHEWAN.—Maps showing disposition of lands. Corrected to January 1917. Scale 1 : 792,000 or 12½ miles to an inch. Prepared in the Natural Resources Intelligence Branch under the direction of F. C. C. Lynch, Superintendent. 2 sheets. *Department of the Interior, Ottawa.*

MANITOBA, SASKATCHEWAN, AND ALBERTA.—Map showing Elevators. 1917. Scale 25 miles to an inch. Prepared in the Natural Resources Intelligence Branch under the direction of F. C. C. Lynch, Superintendent.

Department of the Interior, Ottawa.

MANITOBA, SASKATCHEWAN, AND ALBERTA.—Map showing Branches of Chartered Banks. 1917. Scale 25 miles to an inch. Prepared in the Natural Resources Intelligence Branch under the direction of F. C. C. Lynch, Superintendent.

Department of the Interior, Ottawa.

QUEENSLAND GEOLOGICAL SURVEY.—Geological and Topographical Atlas of the Gympie Goldfield and Environs, by B. Dunstan, F.G.S., Chief Government Geologist. 1910-1911. In 36 sheets. Scale 1 : 4752 or 13·3 inches to a mile.

Department of Mines, Brisbane.

The geological map is complete in 18 sheets, and shows all the formations in elaborate detail; the 18 sheets are then repeated with topographical features. The relief is shown by contour lines at intervals of every 10 feet. Altogether this atlas is a very creditable piece of colonial cartography.

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

THE PROBLEM OF ALSACE-LORRAINE.[1]

By MARION I. NEWBIGIN, D.Sc.

(*With Sketch-Maps.*)

IT has, perhaps, become a commonplace—though one which it seems worth while to repeat—that the conflagration which has extended to and beyond the confines of the civilised world owed the rapidity of its spread to the pre-existence, in the Europe of peace, of four areas in which passions had been smouldering for years. The flames first leapt up along the belt where Europe proper meets the East in the Balkan Peninsula: but, in Alsace-Lorraine, in the Trentino, in Poland, especially Prussian Poland, human material was already near the ignition point. That the final outburst started from Sarajevo, and not from Zabern, should not blind us to the fact that the latter was also a danger point. At present, though the Balkan conflagration is far from being yet burnt out, it seems possible to say that there are indications, if as yet indistinct ones, that it is not beyond human capacity to devise a political scheme which will at least lower the flash-point in future in that still-vexed area. But, it seems almost certain, bearing in mind the difference in social and industrial development between the East generally and the rest of Europe, that the world must reckon on the possibilities of explosions there for a long period of time. It is essential, therefore, that so far as possible we should guard against a new catastrophe by taking care that such a chance leaping up of smouldering fires should

[1] A lecture delivered at an afternoon meeting of the Society on February 7, 1918.

The maps accompanying this article, with the exception of Fig. 5, have been drawn by my sister, Miss Florence Newbigin, from my own rough sketches. For the block of Fig. 5, I am indebted to the Society of Engineers. The map was originally drawn for a paper by Prof. W. G. Fearnsides, of Sheffield University, who has kindly consented to its reproduction here.

not find inflammable material elsewhere, and once more spread across Europe and the world.

Of the three other disturbed areas already named, the conditions in two cannot, at the moment, be profitably discussed. At first sight it may seem that the third problem, that of the political destiny of Alsace-Lorraine, is so simple as hardly to merit detailed consideration. It is, however, in point of fact one of considerable complexity, with bearings upon many others which press for solution. On this account, therefore, it appears justifiable to set forth the elements of the situation in, so far as may be, a compact and convenient form, from the geographical side. More than this will not be attempted here, for, though the object is to attempt to lay the basis for a political settlement, that settlement is in itself outside the sphere marked out.

The Frontiers of France.

It is not possible to appreciate fully the significance of the Alsace-Lorraine problem without a brief reference to the frontiers of France generally. The essential points are clearly brought out on the accompanying sketch-map (Fig. 1), which shows that, with one notable exception, the boundaries of the country are for the most part natural: natural because, save in the north-east, they are made by steep-sided mountains of recent origin, or by the sea. In the tract which extends from the vicinity of the town of Bâle to the North Sea, however, high land is either absent, or, where present, is not composed of young folded mountains.

The contrast between the two types of high land is important, and to realise its significance it is necessary to glance for a moment at the general character of the Pyrenees, the Alps proper, and the Jura, which all play so important a part in demarcating France.

To such bounding chains we may justly apply the term "natural," and that for two reasons whose relative value has changed in historical time. The first depends upon a fact of human geography, the second upon strategical needs. Pyrenees, Alps, Jura, alike, whatever their relative height, resemble one another in the steepness of their slopes, and therefore of their stream valleys; in the rapidity with which erosion takes place, and therefore in the tendency to display bare rock surfaces and masses of coarse débris; in the rapid change of slope in the valleys, and in the frequency of gorges. Generally, they show all the characters of areas which have undergone marked and geologically recent elevation. In consequence they tend, on the whole, to repel settlement, to constitute areas with a low density of population. Further, where settlement does take place, the peopled areas are isolated, and thus combination is difficult, patriotism is local rather than national, and complex communities are not likely to arise. Such areas, therefore, are naturally marginal, not central, and seem to be set apart by nature as boundary zones.

At a later stage in human history, when complex organised States have arisen in the plains which such mountains separate, these acquire a new importance, depending upon military needs. Lines of communica-

tion across them are necessarily few, and they can be artificially blocked with greater or less ease, for they are commanded by neighbouring heights. It is to the interest of the States on the near and hither side to strive to keep an invading army away from the accumulated wealth of the plains, and the physical features of the mountains facilitate this.

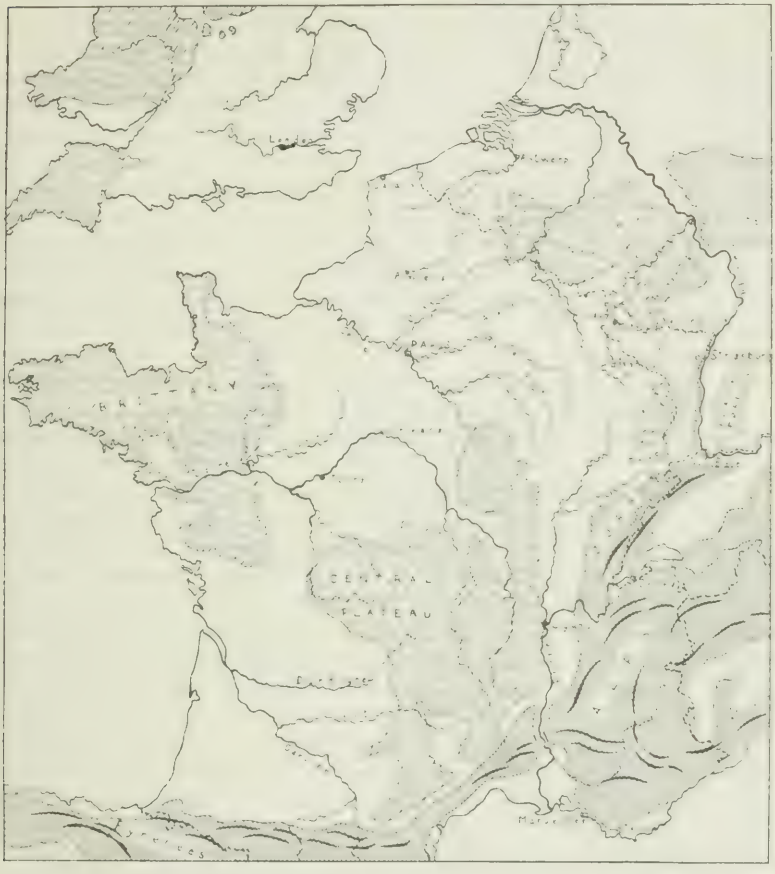

FIG. 1.—Structural Map of France showing boundaries in 1870 and in 1914. The young folded mountains (Pyrenees, Alps) are indicated by one type of shading, the plateau regions, built up of old, hard rocks, by another. The unshaded areas are regions of unfolded, younger rocks, whose dip is for the most part slight. The area annexed by Germany from France in 1871 is dotted lightly. (*In part after Barrès.*)

Both of these are, of course, elementary points, but it is well to emphasise the close connection between the geological structure and history of such mountain belts, and their significance as natural frontier zones. The fact that, as the map suggests, they do not, as is sometimes loosely supposed, consist of a single chain of crests, but of a series of

folds (indicated by black lines) which may exercise marked influence on the course of the rivers, is of much importance in connection with their frontier function. Their great elevation has also, of course, a marked effect on climate, and, in temperate latitudes, the mountain climate is unfavourable to settlement.

We have next to consider the character of the uplands which occur, in two separate masses, on the north-eastern frontier of France. But, before doing this, it is important to note that, as the map shows, these share certain characters with other highlands, found well within the boundaries of France. The upland of Brittany, the irregularly shaped mass known to geographers as the Central Plateau, alike resemble the marginal highlands of the north-east in their geological structure and in their history. All are composed of old, hard rocks, sometimes mingled with volcanic beds belonging to a much later period. In all the surface has been worn down by long-continued erosion, so that, except where recent faulting has taken place at their margins, their slopes are gentle, their river valleys far less anomalous in character than those of the folded mountains. There are no true mountain peaks, and exposed rock surfaces do not occur over extensive areas. On the other hand, the soil is often infertile or shallow, sometimes impermeable, and the areas tend to be covered with dense forest, or with upland bogs, or with upland pastures, or with a combination of all three, long after the lower grounds have been cleared for tillage.

It is obvious then that, though to a less extent, they share the character of the true mountain belts in tending to repel settlement, and to be, whatever their position as regards the country as a whole, marginal in relation to its densely peopled lands. In all, therefore, we find human groups which have stood more or less aloof from the historical development of the lower grounds. The Breton language in Brittany, the persistence of German on the eastern slopes of the Vosges and in part of Lorraine, the non-Catholic communities of parts of the Central Plateau, are all indications of this fact.

Thus, where such uplands occur within the country proper, their absorption in the general community is a slow and partial process; where they are placed at its edges they may be expected to show, at least for a long period, divided allegiance. At the same time, however, the facts that communication between them and the surrounding plains is much easier than in the mountains proper, and that settlement can, with advancing civilisation, be pushed steadily upwards from the plains towards their summit levels, means that their aloofness is of a far less permanent character than in the case of the mountains. Again, for reasons which also depend upon their topographical features, they are of less value as strategic boundaries, even when continuous, than the Alps or Pyrenees.

Their absorption in the general community has, however, been, within the last hundred years or so, facilitated by a geological fact which, though not shown on the map, can be deduced from it. It has been prolonged to include the southern part of England and Wales, in order to suggest the general similarity of structure between Northern

France and the former. Thus we see on it the greater part of the English plain, with the marginal uplands of Wales and of Devon and Cornwall.

Now we all know that Cornwall and Wales, no less than Brittany or the Central Plateau of France, were for a long period regions which led a life more or less apart from that of the plain. But, in the case of Wales, once an independent political entity, amalgamation in the general community has been within recent times greatly accelerated by the fact that on the margin of the old worn-down upland coal-beds crop out, just as they also crop out in the midst of the English plain in isolated masses, forming the Midland coalfields. The industrial type of life has grown up, alike at the margin of the upland, and in the heart of the plain, on the basis of the coal-beds.

Without at the moment laying stress on the point, it may be noted that in France and its borderlands also coal-beds sometimes occur at the margin of the uplands, and have brought a new density of population, a new type of life, a new complication also, to the once isolated communities of the uplands. Coal occurs especially at the north-western and south-eastern margins of that upland mass whose western extremity is named Ardennes on the map.

Let us look next in a little detail at the bordering highlands of France. The smaller, roughly triangular in shape, is named Vosges on the map. But it does not correspond to the whole of the Vosges Mountains of the atlas map, for, as we shall see later (Fig. 2), the actual nucleus of the Vosges, as represented here, is prolonged northwards by rocks of a different type, younger in age, different in character, and forming land lying at a lower elevation. The patch shown here, the High Vosges of French geographers, indicates land which over a considerable area rises considerably above 3000 feet. The highest peak, the Ballon de Guebwiller, is comparable in height to Ben Nevis, for it rises to 4670 feet, or some 200 feet higher than the great Ben.

The second patch of highland is the left bank part of the Rhine Highlands, and is itself divided into three parts. To the south-east of the Moselle river is the Hunsrück; then comes an area in which volcanic rocks are intermingled with the old sedimentary beds, forming the desolate Eifel region. Separated from the Eifel by two small river valleys, not shown here, is the region of the Ardennes. The heights here are throughout considerably lower than in the High Vosges. The area which attains 2000 feet is small, and no peak reaches the 3000-foot limit.

A point of very considerable importance, well shown on the map, is that the younger rocks, and therefore the lowlands, interpenetrate the *massif* to the south-west in a great bay, lying on the left bank of the Moselle. This bay is called the Gulf of Luxemburg by the geologists (Fig. 2): politically it constitutes the nucleus of the Duchy of Luxemburg. From the standpoint of human geography it forms an area in which a fairly dense population is possible in the midst of a forested, infertile upland.

The fact that the Vosges and the Rhine Highlands are discontinuous means that three gaps, of very unequal size and character, mark the north-eastern frontier of France. Of these the southernmost, the Gate

of Burgundy, or gap between the Jura and the south end of the Vosges, is the narrowest. It is also commanded by the strong place of Belfort, which resisted gallantly in the crash of 1870, and has not been seriously threatened during the present war. We need hardly, therefore, regard it as a weak spot in the frontier zone. It is worth note in passing, however, that in that it permits of easy intercommunication between the Rhine valley, or rather, the Ill valley, and France proper, it has a considerable bearing upon the problem of Alsace.

The second gap, with the qualification already made, extends from the northern end of the High Vosges to the Hunsrück. Politically it includes a part of Alsace, and the High Plain or Plateau of Lorraine. Here it was that Germany, in 1871, thrust herself across what on any scheme of frontier-drawing must be regarded as the natural boundary of France, and, against the will of the inhabitants, established herself at Metz, and even beyond the Moselle. It is the problem of the political destiny of the whole belt, stretching from the Gate of Burgundy to the point where the Moselle enters the Highlands, which constitutes the Alsace-Lorraine problem proper.

The third gap is that which extends from the western end of the Ardennes to the sea, and here the actual conditions are almost as simple as they appear on this map. In other words, no natural feature, important either from the point of human geography or of strategy, separates the French and Belgian sectors of the coastal plain. Here, therefore, France is open to the foe, or at least was open according to all the older conception of strategists ; we do not yet know how far the experiences of the present war may modify these conceptions. The establishment of the neutral state of Belgium was, from one point of view, an attempt to draw a moral barrier where no material one existed. In August 1914 the world saw the regard which the military Super-state of Prussia paid to a moral obligation.

The Ramparts of Paris.

To understand the temptation which, given the German code of morality, justified the violation of a solemn pledge, it is necessary to look for a moment at the Basin of Paris.

In Fig. 1 the surface features of that basin have been omitted, though to some extent they can be deduced from the courses of the rivers as shown. Paris is the true heart of France, in a far more precise sense than London is the heart of England. Upon it, as the map shows, converges a whole network of rivers, draining from the uplands and their continuations. Two eastern rivers, however, escape the attractive influence of the basin, and by an apparent anomaly, after flowing northwards for a time, break through the marginal highlands to reach the one the Rhine direct, the other the Rhine delta. These two rivers are of course the Moselle and the Meuse, and the nature of the course of each shows that there must be topographical features in the Paris Basin of which this map tells us nothing. What these features

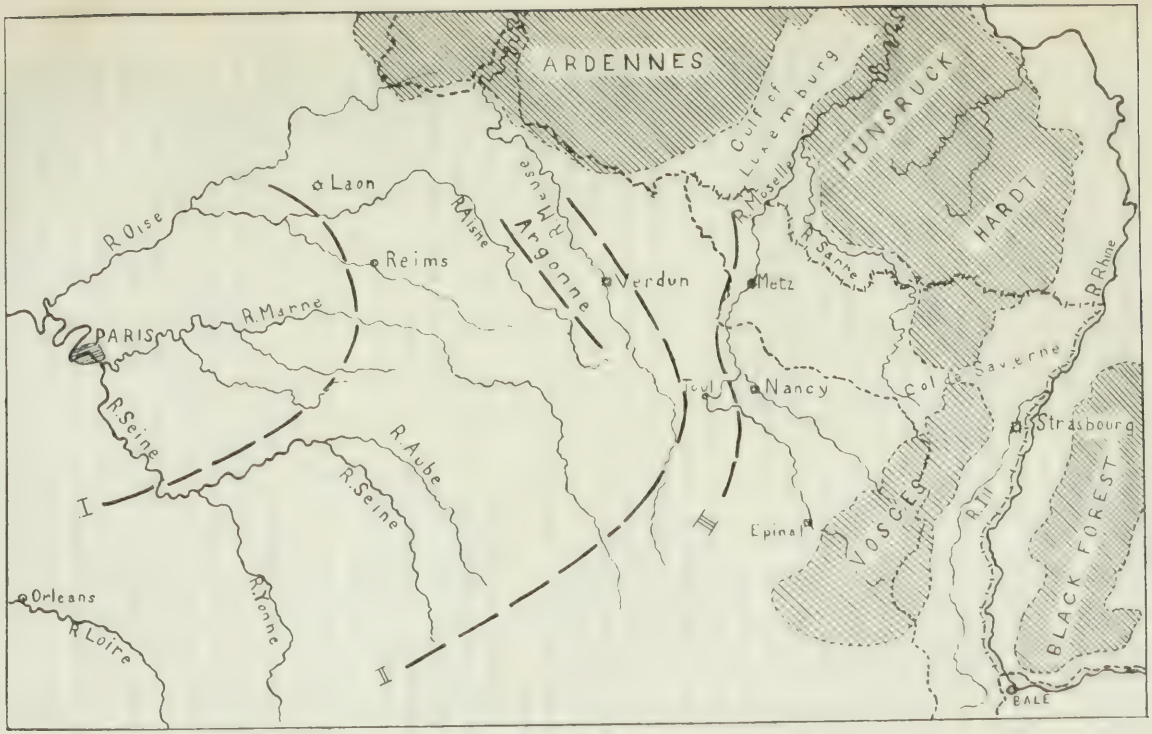

FIG. 2.—The Ramparts of Paris.

The shading in this map shows the upland areas of NE France and the neighbouring regions. It will be seen that the 1871 frontier brought Germany across the low forested uplands (Low Vosges and Hardt) which extend from the plateau region of the High Vosges to the Hunsruck plateau, as far as the crest of the heights of the Moselle near Metz, and beyond this point farther north. The broken lines indicate diagrammatically the outcrops of more resistant rock which constitute the natural defences of Paris from the east. – – – – Frontier of 1914. ⊣⊣⊣⊣ Frontier of 1870.

are has been indicated on Fig. 2, on which are plotted diagrammatically what may be called the ramparts of Paris.

The first point is that the rocks of the Basin and its margins are geologically younger as one proceeds from east to west. Triassic beds—the oldest of the Secondary rocks—form that continuation of the High Vosges which northwards expands into the Hardt region, itself topographically, though not geologically, continuous with the Rhine Highlands. On the other hand Paris, like London, lies in a Tertiary basin. Between these two extremes we have successively Jurassic (oolitic) and Cretaceous (chalk) beds. All these beds are geologically young, all are *relatively* soft. They never form lofty or continuous uplands. But—and this is the important point—they are not uniformly soft. Softer beds often alternate with harder ones, and where there is a marked difference in consistency between two adjacent beds, the softer rocks tend to be worn out by rivers and thus to form valleys, above which the harder beds rise in escarpments. Parts of the courses of the Moselle and the Meuse, the peculiar east-to-west line followed by the Seine during a short tract, are all alike determined by the outcrop of easily eroded beds, and in each case therefore a scarp, or steep-sided hill, bounds one side of the river valley.

The more important of the scarps so produced are indicated in a quite general fashion on the sketch-map, and their significance is perhaps best realised by naming the towns which mark their course. Almost all these scarp towns will be found to have played an important part in the present war, and thus to have become household words for thousands here.

Paris, as already stated, lies in an area composed of Tertiary rocks. These are harder than the Cretaceous clays, etc., which form the next aureole to the east, and thus the margin of the Tertiary zone is marked by an eastward-facing scarp, marked I on the map, through which the rivers cut their way. The position of the towns of Laon and Reims near this scarp is important.

The next ring consists of chalk, but this chalk is generally soft, and the sharp alternation of beds of different character, necessary to produce a definite scarp, is usually absent. Only in the case of the Argonne, a low forested upland, is there anything in the way of a distinctly defined elevation, and this over only a short longitudinal distance. As we approach the Meuse we pass from Cretaceous to Jurassic beds, and these show a very sharp alternation, generally of hard limestones with soft calcareous beds or clays, the first giving rise to definite scarps. Two of these are noticeable and are indicated on the sketch-map. One occurs in the vicinity of the Meuse river (II on map). Immediately to the east of the fortified town of Verdun the outcrop of hard limestones is well marked, forming the Côtes or Heights of the Meuse, which played so important a part in the Verdun fighting. St. Mihiel, which has also appeared in many bulletins, is another scarp town, lying to the south of Verdun.

The Moselle, for a part of its course, runs in the soft Lias clays which mark the base of the Jurassic series. Westwards of these soft

clays a bed of hard limestone crops out, and forms, to the west of Metz, another important scarp, the Côtes of the Moselle (III on map). That at the base of this scarp rich iron-containing beds occur adds, as we shall see, a new complication to the Alsace-Lorraine problem. The scarp towns here are numerous; we would emphasise Metz, lying in the plain at the base of the limestone hills, and Nancy; both are strongly fortified.

East of the Lias clays we come to the Upper Trias beds, chiefly marls, like those which floor much of Cheshire, and, like those, salt-bearing. These underlie the high plain or plateau of Lorraine. Farther east appear the Lower Trias beds, mostly grits and sandstones, harder therefore than the marls, and forming higher ground. These grits are, as it were, plastered on the sides of the High Vosges; in reality they have been removed from the summit levels by erosion, but we speak here of appearances only. Further, they continue the chain of the High Vosges into the Low Vosges, which expand in breadth and rise in height as they pass north-eastwards into the Hardt. Crystalline Vosges, continued into the grits of the Low Vosges and the Hardt, may be said therefore to form the fourth rampart of Paris to the east, though their structure and origin are different from that of the scarps which we have described as forming the other three ramparts.

On the sketch-map a pass is marked as the Col de Saverne. Saverne is of course the Zabern of the Germans, and the name and its significance should be carefully noted. Broadly speaking we may say that the Saverne pass lies near the end of the Crystalline Vosges. It is the region where the elevated forested belt which stretches from the High Vosges to the Hardt is lowest and narrowest. Strasburg, on the Ill, lies almost directly east of Nancy, on the Meurthe, a tributary of the Moselle; the Col de Saverne is the natural line of communication between the two; between what was till 1871 French Alsace and France proper; between the present German Reichsland and France. Here runs the great main railway route to Paris *viâ* Nancy, here the canal which connects the Marne and the Rhine; here also, in conquered land, on a highway of invasion, German officers gave the world before the war an exhibition of Deutsche Kultur.

Let us briefly connect these facts with the events of the war.

Why did the Germans adopt as their main line of invasion in 1914 the valley line following the north-western margin of the Rhine Highlands, the line which follows the course of the Meuse, then that of its tributary the Sambre, and is continued into the Oise valley? Because thus, and thus only, could they turn all the four ramparts of Paris. Why, in 1871, did they establish themselves at Metz and beyond? For more than one reason, as we shall see, but among others because they were thus able to seize the outermost rampart at the point where it was most widely breached, and the next rampart at its most important point. Their purpose was definitely aggressive, not defensive.

Note also the chief incidents of their offensive during the present war. Their treachery in invading Belgium seemed at first to pay, for von Kluck in September 1914 was within reach of Paris, and had evaded

all its fortified lines. The battle of the Marne has often been described as a miracle; even the geographer may be excused for saying that it suggests that might lies not only in the sword and in the fort, but in something deeper. Turned back from Paris, the German armies established themselves on the Aisne, and to-day still hold Laon, on the edge of the westernmost barrier. The Argonne played its part in the battle of the Marne, despite its relative insignificance. On September 8, 1914, the Chief War Lord stood waiting, wrapped in his martial cloak, we are told, to make that triumphant entry into Nancy which was to mark the conquest of the continuation of the rampart which runs north and south from Metz. That triumphant entry has been indefinitely postponed. The siege of Verdun was in part an attempt, due to the failure of the first offensive, to make that direct western attack on Paris from which the German staff shrank in August 1914.

Summary as these notes are, they may serve to suggest the strategic value of the moderate elevations which guard Paris from the east, and are themselves due to differential erosion in the rocks of the Paris Basin and its margins.

(*To be continued.*)

NOTES ON THE PHYSIOGRAPHY OF ARRAN.

By Alexander Scott, M.A., D.Sc.

From the point of view of both geological structure and physiography the island of Arran may be divided into two parts of approximately equal area. The contrast in scenery is very pronounced, the northern portion consisting of a number of rugged peaks and ridges, rising to almost 3000 feet and interspersed with deep valleys; while the southern portion is mainly moorland with rounded hills which seldom exceed 1500 feet in height. The geological structure of the former has been described in detail by the Geological Survey (Gunn, 1903), and although no systematic description of the latter has appeared, several papers on the sedimentary and intrusive rocks have been published in recent years (Gregory, 1915; Tyrrell, 1915).

Apart from the Glacial and Raised Beach deposits, the youngest rocks in the island are the Cainozoic dykes and sills, and these are not later than Miocene. The northern half of the island consists of a great circular dome of granite surrounded on the north, west, and south by metamorphic rocks of pre-Cambrian age; while on the east it abuts transgressively on Palæozoic sediments. The mountains, all of which are found in the granite area, are divided into two groups by the long north and south depression which runs up Glen Easan Biorach from Loch Ranza and down Glen Iorsa, culminating at Loch Iorsa. The eastern group comprises a number of ridges radiating from Cir Mhor, one running north-north-west over Caisteal Abhail to Creag Dubh, one south-south-east to Goatfell, and one south-south-west over A' Chir and Beinn Tarsuinn to Beinn Nuis. Subsidiary ridges branch off from

each of these, as, for example, the Suidhe Fheargus ridge from The Castles, Cioch na h'Oighe, and Am Binnein from Goatfell, and Beinn a Chliabhain from A' Chir.

The eastern group includes a curvilinear ridge which proceeds in a general northerly direction from Beinn Bharrain over Beinn Breac (2333 ft.)[1] to Meall nan Damh, and another from Beinn Tarsuinn (1819 ft.)[1] to Meall Mhor. The area of high land is bounded on the north by the Chalmadale-Sannox depression between which and the coast is a range of low hills. On the southern edge is a broad plateau, about 1000 feet above sea level, and terminating in the through valley which carries the "String Road."

The hills of the southern portion only attain a maximum height of under 1700 feet, and may also be divided into two groups. Situated immediately to the south of the String Road is a large Cainozoic volcanic vent, the igneous and pyroclastic material of which gives rise to the Ard Bheinn group of hills, while to the south-east, and separated from the latter by another depression, is the Tighvein group. This is formed by a large series of Cainozoic sills which have been intruded into the Triassic sediments.

The contrast between the two types of scenery may be paralleled, to some extent, by a similar contrast which is found in Skye, where the mountainous region of the Cuillins is sculptured out of a great gabbro laccolite, while the monotonous plateaux to the north-west are made up of the Cainozoic sills and dykes. The two districts present several other analogies, which will be discussed later.

In endeavouring to determine the history of the topography of Arran, it is necessary to take into consideration, firstly, the effect of the dissection of the ancient Highland peneplain, and of the denudation which occurred prior to the separation of Arran from the mainland; and, secondly, the effect of the denudation which has taken place since the separation of the island. It is generally recognised that the Scottish Highlands have been carved out of a plateau, which may have originally been a peneplain, and the present average height of which is between 2000 and 3000 feet. This tableland sloped gently from north-west to south-east, and many of the higher peaks of the Highlands stood out as monadnocks in the undulating plateau. It probably extended much farther to the north-west than the present land surface, and many of the north-west south-east through valleys of the Highlands were initiated by the consequent streams which drained this plateau. Superimposed on this drainage system is a series of subsequent valleys with a general north-east and south-west trend, following the direction of the strike of the Dalradian rocks, and parallel to a series of faults. In the south-west Highlands the trend is rather south-south-west.

According to Peach and Horne (1910), the second base-level of erosion occurs approximately at the 1000-feet level, but these writers

[1] As there are several hills of these names in the island, the heights are inserted in order to indicate which is referred to.

give few details. Various high-level platforms have been described from the south-west of England and the Snowdon district. Mort (1914) has discussed the origin of the 1000-feet platform in Arran, but the first writer to describe the occurrence of such a platform in Arran was Smith (1896), who remarks upon "the immense amount of marine denudation which has taken place . . . when the sea worked between the 600-feet and the 1300-feet contour lines." A third base-level probably occurs at some depth below sea-level, but the present level of this is variable owing to the submergence being differential.

So far as Arran is concerned, there is little residual trace of the Highland peneplain. The mountains of the granite area probably existed as rounded hills, rising some distance above the general level, but all other traces have long vanished owing to the enormous amount of denudation which has occurred since the uplift of the plateau. The 1000-foot platform, however, is very obvious, and can be seen at many places round the margins of the granite, and also some considerable way up Glen Iorsa. A detailed description of its extent in the northern half of the island is given by Mort (1914). In the southern area the platform is not so obvious, but in many places the land rises steeply to about 800 to 900 feet, and then a fairly abrupt change in gradient takes place, the slopes above 1000 feet being very gentle. This is clearly seen along the eastern margin of the Vent, while in the south-eastern corner of the island a broad extent of moor at the same level is found.

There is no very definite evidence as to the age and origin of the platform. The generally flat surface suggests a high degree of maturity, while the small amount of dissection which it shows in the granite area —save where cut by the deep glens—is indicative of a comparative recent uplift. The comparatively steep gradients by which the mountains of the interior rise from the surface of the platform are favourable to the marine origin of the latter, but, on the other hand, the general structure of the southern tableland points to an advanced stage of subærial denudation. The absence of shore deposits, cliffs, and so forth, as pointed out by Mort, cannot be considered strong evidence in favour of the latter, as the platform was covered by the main ice-sheet of the Clyde area, and probably modified to a certain extent. The uplift is certainly pre-Glacial in age, and as it is later than the Cainozoic igneous rocks, it probably belongs to Pliocene times.

The existence of platforms at lower levels, such as the fairly well marked one which can be seen between Brodick and Whiting Bay at a height of 300 to 400 feet, and the one, at 350 to 450 feet, west of Corrie, cannot be regarded as indicative of the marine origin of the 1000-foot platform. The latter, if a peneplain, must have been worn down to base-level, and there seems to be no reason for assuming that, prior to the uplift, the base-level was at any considerable height above the sea; in fact it would probably be near sea-level. Taking the evidence of the southern plateau into account it is probable that the whole area had reached an advanced stage of subærial denudation, and was then partly submerged, the eastern and western mountains standing out as high

islands, their lower slopes being steepened into cliffs, and the submerged portions modified by sea action. At the same time, the hills of the Vent and of the Tighvein district probably stood up as low rounded islets.

The granite of the mountain area apparently was so much more resistant than the superimposed rocks that, as soon as the rivers had cut down to the former, the topography was determined to a great extent by the shape of the upper surface of the granite. Before the Highland peneplain had reached such an advanced stage of dissection, several of the old consequent rivers must have flowed across the Firth of Clyde. One, for example, occupied the lower part of Loch Fyne, and traversed the Sound of Bute; a second probably rose somewhere to the west of Kintyre, and flowed through Glen Chalmadale and North Glen Sannox; it is possible that a third traversed Glen Rosa, passed to the west of the Clauchland Hills, and then between Holy Island and King's Cross point. The North Channel was occupied by a fourth, and it seems feasible that part of the Firth of Clyde, at least, is due to the tributaries of the latter cutting back and capturing the head waters of the more northerly streams. Kilbrannan Sound may be accounted for in this way.

When the granite was reached, however, the drainage was diverted so that it followed the form of the granite surface. Mort has assumed that the granite was originally a dome, and that this, by river action, was cut down so that the highest land was no longer central, but occupied several isolated areas. This involves the existence of a radial drainage, but it is somewhat difficult to class the river systems of North Arran as radial. There is a very decided north and south trend in most of the valleys. For example, Glen Catacol and Glen Scaftigill are in a north-south line; so are Glen Easan Biorach and Glen Iorsa; Glen Rosa and part of North Sannox. The only valleys of any size in the granite area, whose main trend is other than north and south, are South Sannox and the White Water Glen.

It seems preferable to adopt the idea put forward by Smith (1896) with regard to the upper surface of the granite without at the same time adopting Smith's argument in all its detail. In some laccolites the main direction of jointing is, undoubtedly, parallel to the original surface of the igneous rock, but it is by no means proved that it is always so. Nevertheless it seems very probable that the original surface of the Arran granite was not dome-shaped but undulating, the axes of the crests and troughs being approximately north and south. The Beinn Bharrain ridge would then be an anticline, as would also be the Beinn Nuis-Tarsuinn ridge, Beinn a Chliabhain, and possibly Goatfell. The north and south valleys, such as Glen Iorsa, upper Garbh Allt, and Glen Rosa would occur in synclines, the chief exception being the Glen Scaftigill-Glen Catacol depression. The last seems to lie along a shatter-belt which extends from the foot of Glen Scaftigill to Meall Mhor.

That the major direction of weakness in the granite was north and south seems to be indicated by the fact that the majority of the long dykes have this trend. For instance, one runs from Ceum na Caillich to

the foot of Glenshant Hill, the present bed of the Rosa in fact following the line of this dyke for a considerable distance. Another can be traced from the summit of Beinn a Chliabhain southwards for two miles, while a third of the same length also runs southward from Beinn Tarsuinn. The general consequence was that as soon as the granite became exposed the drainage tended to be diverted to the southward, and it is probable that the original Iorsa was initiated at this time as a tributary of the river which flowed down Kilbrannan Sound. How far back this stream cut is uncertain, but it is possible that it may have beheaded the Chalmadale-North Sannox stream, and thus formed the broad valley which separates the eastern hills from the western. At this period the watershed must have been farther to the north-west, as there is evidence of the existence of some considerable tributaries which flowed in a south-easterly direction into the Iorsa. The col at the head of Glen Diomhan, between Beinn Bhreac (1881 ft.) and Beinn Tarsuinn (1819 ft.), is probably the remnant of the valley of one of these. Another may have occupied the gap between Meall nan Damh and the ridge north-east of Coirein Lochan as well as the col between Glen Catacol and Loch Iorsa, while the shallow depression between Ceann Reamhar and Beinn Bharrain may be due to a third. The north-east south-west depression which runs from Catacol to Thundengray resembles the high level channels which are found in many Highland valleys at some considerable elevation above the present valley floor. We would thus have two areas of high ground, one a long ridge trending north and south in the region of Beinn Bharrain, and the other a more dome-shaped mass with its centre to the north-west of Goatfell, and already partly trenched by the Rosa burn. The drainage of this may to a certain extent have been radial, for we have the North Sannox burn draining northwards, the South Sannox to the north-west, the White Water to the east, and the Rosa Burn and the Garbh Allt to the southwards. There seems little doubt that the Garbh Allt originally drained southwards to Glen Easbuig, and has been captured at a very late date by a small stream cutting back from the Rosa. In the first place, there are traces of a ridge connecting the north-south portion of the Garbh Allt with Glen Easbuig, and this may be a residual portion of the old valley wall, and, secondly, the Easbuig burn begins to cut a trench in the 1000-foot platform very near its present source. As none of the smaller streams have been able to dissect the 1000-foot platform to any extent, it seems probable that Glen Easbuig was cut out by a larger stream than the present one, and that this stream was beheaded by one of the small burns flowing down the west slope of Glen Rosa. The original tributary of the Rosa was probably similar to the burn which drains the small corrie at the south end of the Beinn a Chliabhain ridge. The Garbh Allt has been assumed to be a hanging valley (Mort, 1914), and the amount of glacial over-deepening of the Rosa has been calculated from it, but it seems to the writer that the above explanation is much more satisfactory, and that all that the calculation gives is the depth of the Rosa valley at that point below the 1000-foot platform.

It is, of course, evident that most of the present valleys have been

considerably modified by glacial erosion, but at the same time they are all long pre-Glacial. After the 1000 foot uplift, the streams underwent a great rejuvenation, deep gorges were cut in the platform, giving rise to the present valleys of the Iorsa, Rosa, Sannox Burn, Easan Biorach and Catacol. During the Glacial period most of the corries were formed, and these have generally an east or north-east aspect. The result is that those ridges which originally trended, for example, north-west and south-east, now have a smooth, spurless, south-west face, while the north-east face consists of projecting spurs and deep corrie indentations alternately. Thus the south-west face of Caisteal Abhail has no spurs, while the north-east face, on the other hand, has at least four, Craig Dubh being the most northerly and Suidhe Fheargus the largest. Similarly, the Goatfell group has one spur on the western side and four on the eastern. A parallel state of affairs can be seen in many other parts of Scotland. In the south end of Rum, for example, all the projecting spurs are on the north-east side of the chief range; in Sutherland the Foinne Bheinn group has a smooth south-west face (the wall of an old consequent valley), while the north-east is intersected by numerous corries. There seems little doubt that the formation of these corries should be attributed to ice action, and it is more probable that localised frost action, such as is postulated by Johnson, has been the chief agent, than that they have formed mainly by plucking or grinding. The corries which face south and west, such as the one at the head of the Barbh Allt, and Coire Chattan, south of Goatfell, have been formed chiefly by river action. On the whole, the slopes of the latter are by no means so steep as those of the former, but locally they show signs of steepening through the action of landslides, and it is very probable that many of these landslides occurred in pre-Glacial and Glacial times. The east face of Beinn Tarsuinn and Beinn Nuis has probably developed in this way, but a prominent factor has been the direction of jointing of the granite, the main direction being almost vertical on these slopes. There is no doubt that the slope on many of the valley walls is directly due to the inclination of the joint planes, as where these are nearly vertical or inclined to a high angle there is a much greater tendency for landslides to occur.

The well-known contrast between the two types of scenery may be mainly ascribed to the same cause. Various explanations of this have been given. It has been assumed that smooth ridges were due to the presence of fine granite, and the serrated ridges to coarse granite, but as Mort has shown, this explanation does not hold. The latter writer ascribes the difference to the stage of erosion, holding that the smooth outlines indicate a very immature stage of glacial erosion, while the rugged hills are characteristic of an advanced stage. This involves the idea that the topography of the western hills has been much less altered by glacial erosion than is the case in the eastern hills, nevertheless, the ridge on the east side of Coire Roinn on Beinn Bharrain is one of the most rugged parts of the island, and it is difficult to see why the erosion should have been so advanced on this particular ridge and elsewhere in the same neighbourhood so slight. On the other hand, when the direc-

tion of jointing is considered, it is found that on all the serrated ridges the granite slabs are inclined at a very high angle, while on the smooth ridges the slabs are often more nearly horizontal. Dykes have often been a secondary cause, but the jointing must be considered to be the main factor. On the A' Chir ridge the main joints are nearly vertical, while the ridge is traversed by a number of dykes, the two factors producing the most serrated ridge on the island; on the Caisteal Abhail-Creag Dubh ridge the main joint planes are inclined at a low angle to the horizontal, and though the ridge is cut by numerous dykes it presents a comparatively smooth longitudinal outline. While many of the ridges, such as A' Chir, have been narrowed by the cutting back of two corries, this is not the chief reason for the serrated appearance. Beinn Tarsuinn has a typically serrated ridge, though the gradient of the slope towards Glen Iorsa is not steep in comparison with the perpendicular crags of the eastern face. Hence the most potent factor has been the vertical jointing of the granite. On the whole, the rugged hills owed their appearance and structure mainly to the nature of the jointing, but the ridges may be narrowed by the cutting back of corries and serrated by differential weathering due to the presence of dykes.

The valleys show many of the usually accepted signs of glacial erosion. The walls are steep and the floors flat, so that the general cross-section is a catenary; longitudinally they are straight and spurs are conspicuous by their absence, particularly in Glen Rosa and Glen Sannox, where the sheer smooth walls constitute the most prominent features of the valleys. The valley heads have often been widened by the formation of corries, and the presence of hanging valleys suggests that there may have been some overdeepening. It is, however, very doubtful if the latter has occurred to any extent. As has been noticed elsewhere (Bailey, 1916), for example, in the Ben Nevis district, hanging valleys are not necessarily the result of Glacial action, and may arise in other ways. This has already been discussed in the case of the Garbh Allt, and other explanations can be found for the other examples. The stream from Loch Nuis originates on the 1000-foot platform, and drops down the steep east face of Glen Iorsa. As the stream is small, and has been unable to cut a valley on the platform, it is difficult to understand how it could cut a graded valley any more than the other small burns which flow down the slopes of the Iorsa. Many of the so-called hanging valleys are simply small streams which originate on the 1000-foot platform, and are unable to cut trenches either there or on the slopes of the valley into which they drain.

The case of Glen Diomhan is rather different. The tributary valley, above the junction, increases its grade, and falls 200 feet in a series of cascades. The lower part of the glen is broad and U-shaped, as it also is at its head, but the intermediate part is V-shaped. The most obvious explanation of this is that the lower mature portion is cut in the more yielding shattered area of the granite, and the remainder in the more resistant normal granite, the steep portion of the thalweg being near the eastern margin of the altered area. In the case of the discordant junction of Glen Easan Biorach, and Glen Chalmadale, the explanation given in

the Geological Survey memoir (Gunn, 1903) seems more satisfactory than that offered by the hanging valley hypothesis (Mort, 1914). According to the former, the waterfall is due to the presence of a band of schist indurated by contact-metamorphism. The argument that such a band should induce a similar fall in Glen Catacol, which has been advanced against this view, is scarcely valid, as the amount of metamorphism induced by the intrusion of the granite is very variable, a contact metamorphosed aureole 300 yards wide being found at some parts, while in others unaltered rocks are found within a few yards of the granite. Further, the nature of the schists, and consequently their resistance to erosion, is by no means uniform round the granite margin.

The general conclusion is that, while the valleys have been broadened by glacial erosion, the spurs being truncated and the walls steepened to some extent, there is very little evidence that there has been any great amount of over-deepening. Many of them must have developed their present courses and have been cut down to their present levels in pre-Glacial times, and it is possible that some of the through valleys which now form cols have, in the neighbourhood of the latter, been subjected to little downcutting since the 1000-foot uplift.

In the southern half of the island the topography at the time of the Pliocene uplift must have been very mature. The whole area had been worn down to base-level with the exception of a few low hills in the region of the great Cainozoic vent and the neighbourhood of Tighvein. The persistence of these must be ascribed to the superior resistance of the underlying rocks, the vent consisting mainly of granite and agglomerate with a mass of diorite on the eastern margin, and the Tighvein district of an igneous complex of granophyre and dolerite allied to the Marsco complex in Skye. These rocks would be better able to resist erosion than the soft Permian and Triassic sediments which surround them. Apart from the vent, the present drainage is moulded on the structure of the underlying rocks. The prevalent dip of the sediments throughout the whole area is approximately south-west, and the intercalated Cainozoic sills seem to have the same inclination. As the main streams flow south-west, they are therefore consequent, and flow down a dip-slope. The watershed runs north-west and south-east along a belt containing many igneous intrusions and stretching from Tighvein to Dippin Head, and a number of smaller streams flow down the scarp to the east. This escarpment seems to be migrating to the south-west, as there is a col at Sliddery waterhead which cannot have been lowered by the present streams which flow from it, and which was probably formed by the action of a stream whose source was further to the north-east.

The two chief south-westerly streams, the Sliddery Water and the Kilmory waters, are normal dip streams, and the valleys are ordinary river-cut valleys. The Ashdale burn is mainly a strike stream in the upper (north-west and south-east) part of its course, but the position of the actual gorge is determined by a number of dykes of similar trend. The lower part of the course, where the flow is eastwards, is at right angles to the strike of rocks and against the dip, and a number of water-

falls are formed by the basaltic sills which are cut through. The final part of the course is a fairly deep V-shaped valley cut in the sediments.

Of the streams which debouch in Lamlash Bay, the Benlister burn is an obsequent stream which has cut through the original watershed and diverted part of the headwaters of the Clauchan Burn. A series of thin sills and dykes form a number of cascades in the stream, which falls rapidly from the 1000-foot level to the 200-foot level. The other valley, Monamore Glen, is of a different type, and seems to be along the line of an older valley. It is a deep, V-shaped valley, with great broad meanders for the main part of the course, but the upper portion is an immature gorge draining the Tighvein complex.

The Cainozoic Vent at the commencement of the present cycle of erosion seems to have been of the nature of a dome, and this has been dissected by an approximately radial drainage. The harder rocks of the eastern margin, however, seem to have constituted a barrier, as the streams to the east have not been able to cut back into the vent to any extent, while, on the other hand, Glen Craigag and Ballymichael Glen, draining north and west respectively, are typical deep river-cut valleys. These originally drained into a stream which rose in the northern granite area, occupied the middle part of the present course of the Machrie, and flowed southward past Blackwaterfoot. The consequent Clauchan Burn, draining the southern margin of the vent, was also a tributary of this stream. At a comparatively recent date the latter was intercepted by a small stream cutting back from Machrie Bay; the recent date is proved by the fact that the old river alluvium north of Shiskine is partly below the level of the 100-foot raised beach. Hence the capture must have occurred since the deposition of the 100-foot beach.

The valleys of the southern part of the island have undergone little modification by glacial action, with the notable exceptions of Glen Dubh and Glen Ormidale, draining into Glen Cloy, and to a less degree Benlister Glen. In the two former there are numerous moraines; in Glen Dubh a large crescentic series must have dammed up a lake at one time. The head of the glen forms a corrie, which is due partly, at least, to glacial action. These moraines, and the lateral ones which occur in Benlister Glen, are due to a local glaciation, proceeding from the vent. Although the whole area must have been covered by the main icesheet during the Glacial Period, the main function of the latter seems to have been protective, and there was probably no great amount of erosion during that period.

The area is chiefly interesting on account of the close dependence of the topography on the geological structure, and in this respect it presents many analogies with the basaltic plateaux of Skye (Harker, 1904). In both cases the intrusive sills dip gently in one direction, with a steep escarpment in the opposite; the thicker sills form sea-cliffs, as at Drumadoon, or inland escarpments, and the thinner sills, which give rise to such well marked terraces as in Glen Varrigill (Skye), have their counterpart in the prominent terraces on the south side of Glen Ashdale. In both cases the dykes give rise to gullies and ravines, and the present streams are often entrenched along the lines of these dykes. In Arran

most of the waterfalls can be traced to the effect of the sills, the one notable exception being the lowest fall in Glen Ashdale, which is due to a band of hard sandstone (Tyrrell, 1915). Throughout the whole area there are practically no topographical features which cannot be accounted for on the basis of the geological structure.

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SOUTHERN PALESTINE: SOME NOTES ON HISTORICAL GEOGRAPHY.

By Captain W. R. Kermack.

One result, at any rate, of the war, which is, perhaps, not wholly on the bad side is that, with its will or against its will, the great British public has been taught or retaught a certain amount of classical and Biblical geography. One British army nearly at the site of Troy, another in Macedonia, a third in Mesopotamia, yet a fourth in Egypt and Palestine, must have compelled many a paterfamilias to turn his mind painfully back to schoolboy days, and furbish up again his rusty armoury of classical information. Specially true, perhaps, is this in the case of the campaign in Palestine; and those who agree with Sir George Adam Smith, that "History never repeats, *without explaining*, itself," and who feel that the explanation of the history lies often in geography, will see with interest, but without surprise, our troops reaching in turn Beersheba, Ascalon, Ashdod, and Ekron, fighting in the footsteps of Joshua at Beth-horon, and facing Jerusalem, where Cœur-de-lion hid his face from the city he might not win on Nebi Samwil.

To the ancients Syria was first and foremost a bridge, between the two great river-civilisations of Mesopotamia and Egypt, with the desert on one hand, the Mediterranean on the other. Palestine, which is the southern portion of this bridge, consists of an inland strip of mountain

land and a coastal plain, running roughly parallel to each other and to the sea coast, and each again divided lengthwise into two: the coastal plain into a belt of sand-dunes along the sea, and a broader inland plain of cultivation; the mountains divided by the Jordan valley. In the north of Syria the two great ranges of Lebanon and Anti-Lebanon are separated by the wide valley of Cœle-Syria. The highest summit of the Anti-Lebanon range is Hermon, on the slopes of which are the springs of the Jordan, which then flows southward through the high lake of Merom, descends 300 feet to the Sea of Galilee, and then in a series of twenty-seven rapids plunges down 1000 feet to its lowest depth (1292 feet below Mediterranean sea-level) in the great salt lake of the Dead Sea. Its deep valley, nearly 3000 feet below the level of the Judæan hills, and in most parts not more than eight miles wide, is part of a great "rift valley" which is continued southward to the Gulf of Akaba, which also forms a part of it, by the Wadi el Araba, and then by the Red Sea into Africa. Western Palestine is thus cut off by this Jordan valley from the tableland of the Hauran and the Mountains of Moab.

But though there is access from north to south along the coastal plain, Palestine would never have taken the place it did in ancient history as a bridge between Egypt and Mesopotamia had the hill barrier west of Jordan remained unbroken. It is a capital point in the historical geography of Palestine that between the hills of Galilee, which are the roots of Lebanon, and the mountains of Ephraim, which are the northern end of the mountains of Judæa, there breaks the Plain of Esdraelon, an uneven stretch about twelve miles broad in the region between the Jordan and the Mediterranean Sea, reaching the Jordan through the narrower valley of Jezreel and, by the pass of the river Kishon, joining the coastal plain at the Bay of Acre, just north of the broad beach which rounds the promontory of Carmel. The western end of this Plain of Esdraelon is guarded by Megiddo, as the eastern is by Bethshan, while at its north-east and south-east corners are Mount Tabor and Mount Gilboa, four names ringing with historical association.

From Esdraelon southwards runs a long central spur, forming first the mountains of Ephraim, occasionally broken by wide plains and continuous tracts of vegetation, such as environ Shechem and Samaria, then the grey rounded hills of the Jebel El-Kuds, as it is known about Jerusalem, and then the still higher Jebel El-Khalil at Hebron. Thence it shades off gradually into desert. This plateau is, as a whole, well over 1500 feet above sea-level, while the hills on which Jerusalem stands rise to more than 2500 feet. Seen from the coastal plain, it seems to stand wall-like and aloof, its rock features bare and rounded, crowned here and there on their summits by a handful of trees or a mountain village. The passes of Southern and Central Palestine run east and west, climbing from the Jordan valley and the coastal plain to the central backbone ridge, on which are Jerusalem itself and Hebron, the earlier centre of the tribe of Judah, and, indeed, one of the earliest sites of civilised life in Palestine.[1] From the plain routes of to-day reach the capital by the

[1] Dean Stanley, *Sinai and Palestine* (1912 edition), p. 130.

Wadi Ism'in, which is the course taken by the Jaffa-Jerusalem road by Latrun and Enab, by the Wadi es Surar (Valley of Sorek), the course taken by the railway, or by the Wadi es Sunt. But the usual route of ancient times was up the broad valley of Ajalon ("Valley of Stags," modern Wadi Selman), from which there is a gradual ascent by the Pass of Beth-horon from Beit Ur et Tahta (Lower Beth-horon) to Beit Ur el Foka (Upper Beth-horon), a descent to El Jib (the ancient Gibeon), and a climb again to the commanding height of Nebi Samwil, which is probably to be identified as the "Mountjoy" of the Crusaders, whence pilgrims had their first view of the Holy City, and more anciently as "the high place of Gibeon," where the Tabernacle stood before it was taken by Solomon to Jerusalem. It was this Pass of Beth-horon which was the scene of the great victory of Joshua over the confederacy of the five kings which gave Southern Palestine to the Israelites.[1] Those indomitable road-makers, the Romans, in their turn drove a road straight —or as nearly straight as might be—from Jaffa and Lydda (Ludd) to Jerusalem, over the most unpromising country by Beit Likia and Kubeibeh (Emmaus), a road which must have remained untouched since till taken in hand by our own sappers and pioneers in the present year of grace (1917). From Bethel, farther north on the main ridge, and on the north and south route along the ridge, there descends the pass which was the eastern counterpart of Beth-horon, the Wadi Harith, known to the Jews as the passage of Michmash or Ai, commanded at the Jordan valley end by the city of Jericho.[2] Opposite Jericho are two of the four best known fords of the Jordan.[3]

Eastward from the mountains of Judæa you look to the greater heights beyond Jordan; westward the view takes in the fertile coast plain, the dark expanse of fruit gardens round the white buildings of Ludd and Ramleh, Jaffa still farther off in a break in the sand-dunes, and the sea beyond. From some hill near his capital King Solomon may easily have watched the ships of Tyre bringing south the building material of the Temple—perhaps some

> "Quinquireme of Nineveh from distant Ophir
> Rowing home to haven in sunny Palestine,
> With a cargo of ivory
> And apes and peacocks,
> Sandalwood, cedarwood, and sweet white wine"—

though the principal port of Palestine was Ezion-Geber, on the Gulf of Akaba; and it is indeed small wonder that the inhabitants of these barren highlands should have gazed jealously on the richer Philistine plain that lay at the foot of their hills.

This coastal plain, the second great natural division of the land, stretches between the mountains and the Mediterranean, four miles wide at Acre, two hundred yards only where it rounds Mount

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[1] Dean Stanley, *Sinai and Palestine*, pp. 162, 167-8. [2] *Ibid.*, pp. 158, 232.

[3] The two others are, one below the Sea of Galilee, the other above the confluence of the Jabbok (Wadi Zerka).

Carmel, then at Athlit two miles again, and twenty miles at Ascalon, south of which point it is narrowed again by the foothills of the Judæan plateau. In its northern portion this geographical feature is known historically as the Plain of Sharon, in the south it is the Plain of the Philistines, and north of the Bay of Acre, though the promontory of Ras en Nakura breaks its continuity, it is in all essentials continued into the Plain of Phœnicia. But both south and north it is largely cut off from direct and easy access to the sea by a belt of sand-dunes of varying depth and height, but rising often to 250 feet, lying parallel to and only a few yards from the beach. This belt fringes the coast from just south of Tyre to Sheikh Zewaiid, about which point it merges into the sand dunes of Sinai, and amply explains the absence of decent harbours in Southern Syria, and the insignificance of the sea and of maritime influences in Jewish history. Jaffa, it is true, had in Solomon's time a good harbour, now entirely filled up and covered with fields and orange groves. But even Jaffa was probably a Phœnician settlement, conquered by the Philistines, and it was King Hiram's Phœnician seamen who brought down to Jaffa the rafts of timber—fir, cypress, and cedar—from their northern harbours.[1] The wadis which breach the sand-dunes mostly cross the plain from south-east to north-west, turning due westward for the last mile or so of their course through the sandhills. Such are the Wadi Ghuzze, the Wadi el Hesi, the Nahr Sukereir, the Nahr Rubin, and also a tributary of the Nahr el Auja, the Nahr el Burideh. The coastal plain has good and fertile soil, which, without much irrigation, yields eight to twelve-fold. In the south, round Gaza, the principal crops are barley and beans; the trees figs and olives, the characteristic Mediterranean vegetation. The plain is crossed, as already mentioned, and the sand-dune belt breached by a series of wadis, of which a few only, including the Mukatta (Kishon), and, in the south, notably, the Nahr Rubin, into which drains the Wadi es Surar, carry water except in winter. The greatest of these dry wadis is south of Gaza, the Wadi Ghuzze, four hundred yards wide near its mouth, and with banks rising in places to fifty feet in height. It drains an area reaching south beyond Khalasa, east beyond Beersheba, and north-east to Hebron, and when in winter flood may be impassable for two or three days. On its banks Abraham at Gerar (Um Jerrar) pastured his flocks. But the Philistine plain is agricultural and fruit-bearing rather than pastoral. The heavy night dews of summer and autumn water the summer crops; then with the beginning of the rainy season come the "former rains" about the middle or end of November, and ploughing begins. The "latter rains" come in March and April. The mean annual rainfall at Jerusalem is 26·05 inches; the mean temperature 64° Fahrenheit. The west wind is the rain-bringing wind, and blows on an average fifty to sixty days in the year. The north wind is cold; and the south wind, blowing across the Arabian deserts, very hot. It is the *Khamsin*, so called from the Arabic word for "fifty," for it is popularly supposed to blow fifty days in the year. North and north-west winds

[1] Col. Sir C. M. Watson, *Jerusalem* (Mediæval Towns Series), p. 34, Dent, 1912.

are, at Jerusalem, the prevailing winds, averaging over one hundred days. The east wind is dry, as it also reaches Palestine across desert. In the Stone Age, perhaps about 3000 B.C., Southern Palestine was inhabited by a race, or races, of cave-dwellers. Some of their dwellings have been excavated for the Palestine Exploration Fund by Professor Macalister at Gezer (Tel Jizar), near the railway line from Ramleh to Jerusalem. Others lived in natural or artificial caves on a group of hills on the plateau of Judæa, circled on the west by the valley of Hinnom, and on the east by the valley of the Kidron, which became in time the city of Jerusalem. These people were of small stature, and burned their dead.[1] Southward of these puny cave-dwellers, holding the land from Hebron to Ashdod, spread a tall race, who seemed giants to the Israelite spies, the Nephilim (Numbers xiii. 33 ; Gen. vi. 1-4), Anakim or Rephaim, with whom should probably be connected the remarkable caves, hewn out of the soft limestone of the district, found especially at Beit Jibrin, about the centre of their territory, and two of the few dolmens found in Palestine, west of Jordan and south of Galilee.[2] These Rephaim were not dispossessed when, about 2500-2000 B.C., the first Semitic invaders of Palestine began to enter from the east or south, and with their bronze weapons overcame the less powerful Gezerites to the north. On the contrary, they held their own till perhaps about 1200 B.C., when, just about the time that the Achæan chiefs set out against Troy, three important tribes, the Kenites, Judah, and Ephraim, with a number of subordinate septs, crossed Jordan under their leader Joshua, as part of a second great wave of Semitic invasion. Some, at any rate, of these Israelites or Hebrews, as they called themselves, had come from Egypt, wandering, as the Bedawin tribes do to-day, across the Sinai Peninsula, exhausting the supplies of each oasis they came to in turn, and living on the spring and autumn flocks of migrating quails and "manna" from the desert tamarisk.[3] Part of the invaders turned northward ; part—the Kenites, Judah, and Simeon—turned south, drove the Rephaim from Hebron (Joshua xi. 21), and settled there. A remnant of the Rephaim, however, seems to have been left in Gaza, Gath, and Ashdod, holding the fertile coastal plain ; nor could the newcomers possess themselves of the Jebusite twin fortresses of Jerusalem, on the two hills, the western now called Mount Sion, and the eastern, on which later stood the Jewish Temple, and where stands to-day the Moslem "Dome of the Rock," separated then from each other by the deep Tyropœon Valley.[4] The importance of the capture of Jerusalem by David, about 1048 B.C., was precisely that it made possible the union under him of the northern division of the Hebrew kingdom, which had adhered to Saul, with the southern division already under his own control. Up till then the unconquered Jebusite hill-fortress had made such union impossible.

Meantime, while the Hebrew tribes were in this first state of

[1] Watson, *Jerusalem*, p. 10.

[2] R. A. S. Macalister, *A History of Civilisation in Palestine*, pp. 17, 21. (Cambridge University Press, 1912.)

[3] *Scotsman*, Aug. 14, 1917.

[4] Macalister, *Civilisation*, p. 52; Watson, *Jerusalem*, pp. 11, 16.

disunion and disorganisation in the new territory they meant to settle, another important event was happening in the Eastern Mediterranean. The great Cretan sea-empire received its death blow, perhaps from Achæan invasion from the north, and its peoples were scattered throughout the Ægean and neighbouring waters. Of these some began piratical enterprises upon the coasts of Egypt, and in the reign of Ramesis III. the "Peoples of Sea" combined for a land and sea raid on a grand scale on the Delta. It failed and was beaten back; and the baffled raiders, of whom the chief mentioned on the Egyptian monuments are called the "Purasati," forced to turn aside, settled themselves first on the northern coastline of Palestine, and then, as the power of Egypt weakened, began to spread southward along the coastal plain. There they formed the confederacy of Philistine cities (Gaza, Ascalon, Gath, Ashdod, Ekron) that became one of the chief rivals and oppressors of the disunited Hebrew tribes. Not content with holding the fertile coastal plain from, at least, Dor, south of Carmel, to Gaza, they evidently mastered also the plain of Esdraelon, the great route between the East, Damascus and Mesopotamia and Egypt, and held Bethshan, close to the Jordan. Against them at first, the Hebrews, armed only with bronze against iron weapons, could make no head; though they carried on guerilla warfare in the wadis between the plateau and the plain. But gradually, under Samuel, Saul, and David, the nation won to strength and unity, and after three sharp conflicts with David, himself perhaps at first a Philistine vassal, their power was broken for good, and they gradually became merged in their Semitic surroundings,[1] though their language still lingered on at Ashdod as late as the time of Nehemiah (Neh. xiii. 24).

Even at its height, it is worth noting, the Philistine power centred in a curiously small area. Four of their five great cities, Ekron (Akir), Ashdod (Esdud), Ascalon (Askalan), and Gath (Tell es Safi), are enclosed in a tract of plain 18 miles long from north to south and 14 miles across. Gaza, it is true, is 12 miles farther south. It is curious also for a once seafaring folk that of all their cities Ascalon only was on the coast, where remains of its old walls still stand on the sea cliff. Ashdod and Gaza were on the north and south route along the side of the sand-hills; Ekron, where the Wadi es Surar reaches the plain; Gath in wooded country on the slopes of the Judæan hills, and on a road from the north to Beit Jibrin. Again, the whole plain from Ascalon northwards is traversed by ridges with commanding peaks. It is noteworthy that in no case did a Philistine city take the highest of those of its neighbourhood for its site. Not two miles away from Ekron (Akir), for instance, is a more commanding ridge, where is situated the village of El Mughar (236 feet). This certainly suggests that, in spite of the storied prowess of their Israelite rivals in the hills, advantages of trade and cultivation, rather than need of protection, were guiding factors in the choice of site of the Philistine cities. In this respect the villages of the plain to-day still show a marked contrast to those of the Judæan hills. Unfortunately, these ridges and heights on the plain, with their

[1] Macalister, *Civilisation*, pp. 53-7.

almost bowling-green approaches for several thousand yards, and their cactus-hedged gardens—more formidable than barbed wire—have often proved themselves in twentieth-century warfare all too admirable rear-guard positions for the Turk in his retreat.

The territory of the Israelites, too, was a small one. From Dan to Beersheba is only 180 miles; from Jordan to the sea is rarely more than 50 miles; and it must be remembered that for a long period of their history the Jews did not hold the coastal plain. Under David and his son and successor the Hebrew monarchy reached its zenith. On the north it perhaps was owned as overlord as far as the Euphrates; on the south it controlled the Bedawin tribes of the desert as far as the Wadi el Arish, "the river of Egypt," and the more settled population at the mouth of the wadi. Solomon, however, seems to have forgotten, as David never forgot, to hold the balance between the two halves of his dominions. He neglected the other tribes to enrich Benjamin and Judah, amongst whom his capital was situated; and as a result, on his death the disruptive tendencies of north and south, and the jealousy between Ephraim and Judah prevailed, and his empire split into the two kingdoms of Israel and Judah, generally at strife one with another, and both in consequence the ready prey of the great empires growing up on their borders. First, Rehoboam of Judah had in 970 to buy off Shishak, Pharaoh of Egypt. Then Assyria, instead of Egypt, became the enemy, and Shalmanezer in 721 captured Samaria, the capital of the northern kingdom, and transplanted its population, while Judah was left only partly independent. It was probably as a vassal of Assyria that in 608 Josiah attacked Pharaoh Necho at Megiddo in the Esdraelon plain. On his defeat there and his death his kingdom exchanged Assyrian suzerainty for the overlordship of Egypt, only to be brought back under Assyria eight years later by Nebuchadnezzar. Then last, on Zedekiah's attempt in 586 to throw off the Assyrian yoke by Egyptian aid, Jerusalem was besieged by Assyria and captured, and the city was destroyed.

TRAVEL MEMORIES.[1]

By Lieut.-Colonel A. C. Yate, F.R.G.S., F.R.Hist.Soc.

(With Illustrations.)

Starting from Abādeh, where we had passed the night, at 5 A.M. on the 9th June (1881), and winding along in the deliciously cool morning air, amid villages, fields and gardens, we thoroughly enjoyed our ride to Shulgistan, distant from Abādeh 16 or 17 miles, where we arrived at eight o'clock. Our road, gradually on the ascent, ran almost due north, a distant snow-flecked mountain-range flanking it on the west. Above the mud walls and roofs of the village of Shulgistan rose the

[1] Continued from p. 20.

dome of a mosque, the dilapidated blue tiling of which was indicative certainly of the depredations of time, and possibly of those of the curio-hunter also. In the early eighties of the nineteenth century the passion for Persian art treasures was in a measure in its infancy. It would almost seem as if telegraphy had paved the way for the art-collector. We found the Director of the Indo-European Telegraph at Teheran and the Inspector at Dehbid alike devoted to the search for and acquisition of specimens, the first animated by the love of art, the second by the love of lucre. Unless my memory betrays me, Messrs. Ziegler and Co. were already, in 1881, in the field, and, apparently, have as yet far from exhausted the resources of a country which may claim—as far as history enlightens us—to be a pioneer of Aryan art culture and civilisation. As to Persian curios, we have at this moment before us, in one of the most fashionable of the business centres of London, a collection of which the prices are simply fabulous. I can look back to the days, from thirty to fifteen years ago, when the Afghan Boundary Commission (1884-6) and the Art Exhibition at King Edward VII.'s Coronation Durbar at Delhi (1902-3) gave us opportunities of gauging the values of Middle Eastern fabrics, and the only conclusion at which we can arrive is that—despite war prices, despite taxation, despite charities rampant, and despite threatened confiscation of capital—the purchaser is more profuse and the seller more extortionate than ever before within the memory of man. I have still good cause to recollect the perils by land and water which waylaid my own collections of 1884-5 on their way from Herat to India; but, in those days, not even Jules Verne fully foresaw the prowess of the submarine menace, and it was scarcely realised that the very struggle for existence would oblige governments to tie down marine transport to the carriage of the necessities of life only. It is true that to the creature who pleaded "Il faut pourtant vivre," Talleyrand replied, "Je n'en vois pas la nécessité"; but Talleyrand was not face to face with the threat of bread riots.

"We left Shulgistan at 8.30, and reached Yezdikhāst (6 farsakhs = about 20 miles) at 11.45. The road traversed a broad uncultivated valley, bounded by sterile hills. The power of the sun was great, and our faces, necks and hands were blistered and very painful. One discerns Yezdikhāst from a long distance, and imagines it to be a village situated on the level of the plain. It is only when one approaches quite close that one discovers a wide fissure in the plain, in which flows a small river, the banks of which are lined with orchards, gardens, and fields of grain and opium. The river-bed, *i.e.* the entire space between the cliffs, which are 60 or 70 feet high, has an average width of about a quarter of a mile. Notwithstanding the barrenness of the surrounding plain and the unattractive mud-hue of the cliffs, the effect of the vale is generally pleasing. Probably during the floods the river rises much above its present level, but it does not appear to reach from cliff to cliff. We descended into this channel by a zigzag road, and, following the right bank of the stream for half a mile, reached a fine new *kārwān-sarai* standing on the right bank just opposite the bridge, which affords

means of passage to the left bank, where stand the village and the *chāpārkhāna*. After unloading and conveying our kit to the upper story (known in Persian as the *khilwat* or private apartment) of the *sarāi*, we settled down in the front verandah facing the river and village, and breakfasted on eggs and bread, *māst* (curds) and jam. The eggs (raw), beaten up with water and sugar, make a refreshing and nutritious drink. Fortunately, one can always get fresh eggs in Persia. Fresh milk, again, is difficult to procure. *Māst* is generally obtainable, and here we got it of very fair quality, fresh and less sour than usual. Mixing jam with it, we found it very palatable. When really well prepared and pure, as we got it later in Isfahan, and eaten with sweet preserved fruits, it is excellent. The Persians themselves, I am told, eat it sweetened with *shira*, *i.e.* treacle made from inferior or refuse grapes. Persians thoroughly utilise their grapes, eating and making wine from the best kinds, spirits (*i.e.* عرق = arrack) from the skins already pressed for wine, and treacle from those fit neither for eating nor for wine."[1] And now to describe this remarkable village. The engraving in Malcolm's *Persia* is (considering that the original must be at least 110 years old[2]), a tolerably accurate representation of the river-face of the village. It gives, however, a false impression in that the architecture looks very superior to the reality, that the small balconies of boughs, supported by beams protruding a few feet from the walls, are not shown, and that there is no trace of the repulsive use to which these balconies are put.

The student of Persian life and manners should examine the illustrations of Yezdikhāst given by Curzon and Bradley-Birt, and then read the following passage from Dupré (*Voyage en Perse*, 1807-9): "On pénètre par un petit pont en planches dans ce bourg, qui offre l'aspect le plus dégoûtant, à cause des immondices qui salissent les murs des maisons." To English eyes this picture drawn in French is less repellent than one painted in blunt English. The copy of "Dupré" from which I quote is the one formerly in the Beckford and Hamilton libraries with William Beckford's notes.

It is a remarkable thing that travellers who have visited and carefully described this place are markedly at a variance in regard to the compass-bearings of the entrance to it. Binning puts it on the "north-east" side, and Bradley-Birt says that the sole entrance is by a narrow foot-bridge which connects the village with the "northern" bank. Morier writes: "To the east, over a rude drawbridge, is the entrance to the town." Buckingham says, "The only passage into the town was at the south-west end," and this last statement is confirmed by Lord Curzon (*Persia*, vol. ii. p. 67), who, as it would seem, took particular note of the compass-bearings of the entrance. The statement in my own diary is, "The entrance is from the south by a drawbridge over the moat"; but I took no exact bearing. I doubtless judged roughly by the sun. I do not propose to devote time to the reconcilia-

[1] Quotation from Diary.

[2] *I.e.* to-day, in 1918. The picture is at p. 160 of vol. ii. of the *History of Persia*.

tion of these conflicting statements. I accept south-west as approximately correct.

All writers remark upon the deception which the position of the village exercises upon the approaching traveller, who, only when he is close to it, finds himself upon the edge of a cliff 80 feet high, with a river-bed 400 yards broad below him, and in the centre of the river-bed a rocky islet with almost sheer cliffs, on the top of which is perched a village, the walls of which rise flush with the edge of the precipices which form their foundation. I have myself found interest in comparing the description (too lengthy to quote here) given by Chardin of Yezdikhāst, and his large picture of it with those of more recent travellers. He describes it as "Château et Bourg"; the Château on the rock, the *Bourg* at its foot. He describes its splendid fertility and the copious waters of the river, "lorsque les neiges fondent," and having borne testimony to the excellence of the caravansary in which he was lodged, he pays a similar compliment to the local *boulanger*. "On mange dans ce Bourg-là le meilleur pain de toute la Perse, où il passe aussi en Proverbe parmi les gens de bon goût. Ils disent que pour faire chère entière, il faut avoir Pain de Yezdecast, Vin de Chiras (Shiraz) et Femme de Yezd." A little reflection upon the material which Georgia and Circassia furnish to the slave markets and harems of Turkey and Persia induces him to add, "Le Proverbe doit être ancien." After spending fifteen or sixteen years in Oriental travel, Chardin, the son of a Huguenot jeweller, found it wiser, when he returned in 1681 to Europe, to settle in London. It is true that the Revocation of the Edict of Nantes was not proclaimed until 1685, but of the 400,000 good subjects whom Louis XIV. lost by that act of folly, many, Chardin's family included, had, doubtless, taken time by the forelock. Like many other Huguenots, he found home and fortune in England. Report has it that, ten days after his disembarkation in April 1681 in London, he was knighted by Charles II. and married (to a refugee Huguenot lady) on one and the same day. By 1686 he had brought out the first instalment of his travels, and was then appointed to the honourable and onerous post of "ministre plénipotentiaire du roi d'Angleterre auprès des États de Hollande, et agent de la compagnie anglaise des Indes orientales auprès des mêmes États." The descendants of this distinguished traveller and diplomatist exist to-day in England, as the Hon. Sec. of the Huguenot Society has kindly informed me.

The testimony of later travellers, to wit Buckingham and Bradley-Birt, shows that this neighbourhood had, since the days of Chardin, become the marauding ground of the Bakhtiaris. The caravansarais in the vicinity were in consequence strongly walled and capable of defence. Buckingham finds the sarai full of Persian soldiers, who promptly suspect him of being either a Bakhtiari spy or a bandit pure and simple. If Mr. Buckingham was attired in the gorgeous "costume worn in his travels," which illuminates the frontispiece to his book, the instinct of the Persian soldier, as rapacious, doubtless, one hundred years ago as to-day, would have been not to immolate but to "fleece" him.

Incidentally I may mention, for the enlightenment of those who do not know Persia and the Persians, that the inhabitants of Yezdikhāst, behind their raised drawbridge, enjoy such immunity from exorbitant taxation and official and military rapacity that travellers dwell not upon the gratitude, but upon the "insolence" which their position of security inspires. Human nature all over, and by no means unpardonable! Secure as seems its site, where the Fars and Irāk frontiers meet, it has run the usual gauntlet of fortune. It was clearly in Chardin's day a more important place than it is now. When the Afghans overran Persia, about 1725, Yezdikhāst was taken by assault and the inhabitants put to

A group of Guebres. Taken about 1900.

the sword. When, upon the death of the humane Prince Karim Khan Zend in 1779, Aga Muhammad Khan Kājār fled to Māzanderān,[1] and Ali Murād Khan Zend proclaimed his independence, that Hun-hearted ruffian Zakki Khan, came from Shiraz to Yezdikhāst, and there demeaned himself with such cold-blooded brutality, that his own followers cut by night the ropes of his tent, and the populace of the town rushed in and finished him off as he lay struggling in the heavy folds of the canvas. These unsightly walls have indeed seen their tragedies.

Several of the many travellers who have visited and written about Yezdikhāst, mention, I notice, that there is said to be a direct route

[1] He covered the distance from Shiraz to Isfahan in three days, a day less than my brother and I gave to it. We, however, were not fleeing for our lives. I believe Britons in quest of a record have done it in fifty hours or so; but their horses were, of course, laid out.

from that village to the well-known town of Yezd, which is an important centre of trade, and also the chief home of the Guebres, the name by which the Persians who still adhere to the Zoroastrian religion are known to us. The bee-line from Yezdikhâst to Yezd measures about 130 miles, and traverses for at least 70 miles an apparently unsurveyed tract of desert and salt-marsh. Therefore, I conclude that for a small unencumbered party, mounted on good camels or horses, the march is perfectly feasible. The fact, however, remains that no European has ever taken this route and left on record that he has done so. Curzon (*Persia*, vol. ii. pp. 265-6), gives a complete list of European travellers to and from Yezd. The *Travels* of Dupré, Khanikoff, M'Gregor, are before me, but to those of Colonel Trézel and Herr Petermann I have not here access. It is a remark by M'Gregor (*Khorassan*, vol. i. p. 66) that has tempted me to make this digression, and the subject appears to me so interesting that I offer no excuse for making it. These are M'Gregor's words:—"I regret very much that when I was at Taft[1] I had not read M. Khanikoff's *Mémoire sur la Partie Méridionale de l'Asie Centrale*, or I might have explored the famous cavern of Taft, which he mentions as containing very rich lead mines and traces of turquoise; *and my attention was certainly not called to this cavern.*" I have myself italicised this remark of M'Gregor; for it evidently is intended to emphasise the fact that he stopped twelve or fifteen hours at Taft and never heard a word about it. Similarly in 1808 Dupré, who was on the staff of General Gardaune, Napoleon's envoy to the Shah of Persia, visits Taft, devotes a page to its interests and industries, but never alludes to the cave. The one seeming confirmation that we have is to be found in Curzon's *Persia* (vol. i. p. 264), where we learn that Colonel the Hon. George Napier (about 1874) and Mr. (now Sir) Arthur Herbert (1886) also testified that "traces of turquoise" were to be found at Taft. With this preamble I give a *résumé* of that which M. Khanikoff has left on record. As a place that has been a great centre alike of Zoroastrianism and Sufi-ism, produces some of the finest of Persian felts, and is the hill-station of Yezd, it has claim to attention; but we are here concerned with its minerals, its lead, turquoise, lapis-lazuli and silver. Khanikoff writes:—"Je terminerai cette digression par quelques mots sur la fameuse caverne de Taft, connue en Perse comme une des plus riches mines de plomb. M. Gœbel [Khanikoff's geologist] a visité cette localité curieuse, et il y a découvert des gisements de turquoises. À Taft, on m'a montré un petit ouvrage persan, intitulé *Toouhidi*[2] *mufassal*, où il est rapporté que pendant la domination des Mongols un vizir du Khakan, amateur de minéralogie, chargea un homme connu par sa véracité de visiter cette caverne." This passage might lead us to suppose that Gœbel saw the cavern. Khanikoff only says that he visited the "localité." The Mongol rule in Persia extended over the thirteenth

[1] Ten miles south-west of Yezd, and situated amid hills. Professor E. G. Browne of Cambridge also informs me that he visited Taft and heard nothing of the cave.

[2] This ungainly effort at transliteration perhaps represents the Arabic word Tauhîd (توحيد), which means "unity."

and fourteenth centuries A.D. As to the "Khakan," Yule's *Marco Polo* (2nd edition, vol. i. p. 9, note) states specifically that that was "the peculiar title of the supreme sovereign of the Mongols, and, if not borne by Chinghiz, was certainly assumed by his son Okkodai or Ogdai." By this we fix the date of this romantic and very interesting tale of exploration as lying between, say, 1250 and 1400 A.D. After long wanderings the two explorers (a third man was left at the entrance with strict orders not to quit his post before nightfall—the exploration clearly began in the morning) "entrèrent dans une grotte où ils aperçurent des squelettes humains et quelques lambeaux de vêtements à demi pourris, tristes dépouilles de quelques-uns de leurs hardis prédécesseurs qui y avaient perdu la vie. Bientôt après l'un des explorateurs, celui qui portait la torche allumée, fit une chute et la torche s'éteignit." Thus left in darkness they still cautiously, *à tâtons*, continue their advance, and finally reach a spot where a faint glimmer of light through a lateral fissure enabled them to see what lay before them. A huge mass, detached from the vault blocked their further progress. They realised that "leur montre qu'ils n'avaient pas eu le loisir de consulter jusque-là leur indiquait qu'il était une heure de la nuit, et qu'ainsi ils avaient marché pendant plus de douze heures." We will not discuss here the state of the art of watch-making among the Mongols in the thirteenth and fourteenth centuries of our era. It may be that Sir Henry Howorth sheds light upon this topic; but how the two explorers could see the time by their watch at one o'clock of the night, unless that watch were a luminous one, is a mystery. Yule admits that Marco Polo found the clepsydra in use in the Far East, but of the portable and luminous watch there is no trace. Khanikoff concludes with these words, "Les spécimens de roches qu'ils apportèrent avec eux permirent d'établir que les cavernes qu'ils avaient visitées contenaient des gisements de lapis lazuli et du minerai d'argent." M'Gregor and Khanikoff alike earnestly hope that some future traveller will clear up the doubtful point of the existence of this cavern. When Brigadier-General Sir Percy Sykes, one of our greatest authorities on Irān and all things Iranian, and other British officers are located in Eastern Persia, and, being practically masters of the situation and likely to remain so for some years to come, have a free hand for exploration and surveying, the present would seem to be a most favourable opportunity for ascertaining whether or not Taft conceals in its vicinity a cave worthy to rival the "Mammoth Cave" of Kentucky. I make this suggestion, not forgetting that the first call upon the energies of all these officers is that of duty to our Empire and defeat to the *Drang nach Osten*. But there are moments of relaxation.

Having been lured by this cavern mystery to within 10 miles of Yezd, the principal home, as I have said, of the *Guebres*[1] of to-day, I wish

[1] The Persian word is *Gabr* (گبر), which I have heard Persians pronounce *Gaur*. I see it stated that *Gabr* is the Persian adaptation of the Turkish word which has been Englished into *Giaour*. I am no Turkish scholar. If the Mongols applied the word to the inhabitants of the Persia which they overran and conquered, it seems likely to be a "term of endearment." The followers of Zoroaster who fled to India carried with them the designation of Parsi, and have retained it to this day. *Vide*, further, Benjamin's *Persia*, pp. 130 and 356-7.

to take this opportunity of reproducing what Chardin says of Parsi burial. We who know India are very familiar with "Towers of Silence." Bombay, Poona, Karachi, all places where Parsis congregate, have their Towers of Silence. You look at their solid circular white-washed walls from a distance, and you note the crow, kite, and vulture hovering round. But few of us perhaps ever view the inside. (There must be no confusion of the "Tower of Silence" with that which was known to the Persian as "Atish-gah." (I give here a picture of the old Atish-gah, near Isfahan.) Chardin (vol. ii. p. 186, edition Amst., 1735), who writes of 250 years ago, thus describes the Parsi burial place of Isfahan, situate about $1\frac{1}{2}$ miles from the town, in a secluded spot: "C'est une

Atish-gah, Isfahan. Taken in 1906.

tour ronde, qui est faite de grosses pierre de taille ; elle a environ trente-cinq pieds de haut et quatre-vingt-dix pieds de diamètre, sans porte et sans entrée."

Chardin next describes the method of conveying the dead from the top of the wall to the base inside: "Cette tour a au dedans un degré fait de hautes marches, attachées contre le mur en tournant. Quand ils portent un Mort dans ce Tombeau, trois ou quatre de leurs Prêtres montant avec des échelles sur le haut du mur, tirent le cadavre avec une corde, et le font descendre le long de ce degré, qui est cent fois plus dangereux et plus difficile qu'une échelle, n'y ayant rien à quoi on puisse se tenir ; car ce ne sont que des pierres fichées dans le mur, à trois ou quatre pieds l'une de l'autre, non pas en ligne droite, mais en tournant et qui n'ont pas plus de neuf pouces d'assiette ; aussi avais-je très peur

de tomber, tant en montant qu'en descendant. . . . Il y a dans celui-ci une manière de Fosse au milieu, que je vis remplie d'ossements et de guenilles. Ils couchent les Morts tout habillés sur un petit lit. Ils les rangent tout autour, contre le mur; si serrés qu'ils se touchent les uns les autres, sans distinction d'âge, de sexe ou de qualité; et ils les étendent sur le dos, les bras croisés sur l'estomac contre le menton, les jambes croisées l'une sur l'autre, et le visage découvert. On met proche du Mort, à son chevet, des Bouteilles de vin, des Grenades,[1] des Coupes de fayence, un Couteau, et d'autres ustensiles, chacun selon ses moyens." It is well worth while to compare this account (there is much more, but I have quoted enough) with that given in the *Encyclopædia Britannica* of the Parsi *Dakhma* or "Tower of Silence," and the burial ceremony on Malabar Hill in Bombay to-day. The differences are marked. In the latter a small door in the wall obviates all dependence on scaling-ladders, cords, and perilous steps. Crows at Isfahan, vultures in Bombay, are the *genii loci*. Every *Dakhma* has, or ought to have, its attendant mortuary chapel. Chardin and the *Encyclopædia Britannica* each describe theirs.

We left Yezdikhāst shortly after one o'clock, and passing through Aminābād (fine sarai with āb-ambār in courtyard; near sarai large walled residence; extensive cultivation) and Maksud-beg, we reached Kashera (or Khāshira) at 4.30, the distance being close on 30 miles. "Our horses from Abādah to Kumeshah were all fairly good, and the one that I rode from Khāshira to Kumeshah went like a bird, covering the 13 or 14 miles in one hour and twenty minutes, and that despite ten minutes lost in reloading the post-boy's pony, which fell and, freeing itself of kit and rider, bolted. The post-boy narrowly escaped a fractured leg. However, we all set to, and in ten minutes had pony, kit, and post-bag readjusted, and were off once more at a hand canter in the direction of Kumeshah. Soon the famous pigeon-towers came in sight" (*Diary*). If you would see a picture of a Persian pigeon-tower, turn to Rawlinson's *Ancient Monarchies*, vol. ii. p. 297, and Chardin, vol. ii. p. 128. The traveller towards Isfahan picks up a nice little river just about Maksudbeg and follows it and its pleasingly cultivated valley to Marg, 10 miles short of Isfahan. There the river seems to lose itself, but actually flows on, I hear, into the Zendeh Rud, and so through Isfahan, away to run to earth in that miniature *Kavir* known as the Gavkhaneh salt marsh. The banks of this river are just studded with pigeon-towers, the guano from which works wonders with melons, grapes, and other fruits. For a vine, though, they say, there is nothing like a dead dog or a dead anything snugly stowed away at the roots. My lips still cherish the memory of a luscious, fleshy grape that the wily Afghan used to sell to us in the days of the second Afghan War (1880). That I believe to be the true Linnæan *vitis carnivora*.[2]

[1] Pomegranates.

[2] This is not *dog* Latin.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

Society's Lecture Session.

Evening Lecture.—On March 21st Sir Alfred Sharpe, K.C.M.G., G.B., will lecture on "Eastern Africa after the War," in the Synod Hall, Castle Terrace, at 8 P.M.

Afternoon Lectures.—These are delivered in the Royal Society's Hall, 24 George Street, at 4.30 P.M. On Thursday, March 7, the Rt. Hon. Sir William Macgregor, P.C., G.C.M.G., C.B., formerly Acting High Commissioner for the Western Pacific, and successively Lieut.-Governor of British New Guinea, and Governor of Lagos, Newfoundland, and Queensland, will lecture on "The Settlement of the Pacific," and on Thursday, March 14th, Mr. Andrew Watt, M.A., Secretary Scot. Meteor. Society, on "Meteorology and the War."

GEOGRAPHICAL NOTES.

Europe.

The Peoples of Hungary.—In the December issue of the *Geographical Review,* Mr. B. C. Wallis discusses the physical characters of Hungary, the distribution of the people and of the nationalities, and gives a general account of Hungarian agriculture. The paper is illustrated by a useful series of sketch-maps, and by a number of tables, and contains a large amount of detail. Among the more general points that emerge from the survey we may note that Mr. Wallis is of opinion that, despite the doubts which have been cast upon them, the Hungarian census figures are substantially accurate. Further, in a brief discussion of the claims which have been put forward in some Yugoslav programmes, the author expresses the opinion that the so-called "corridor," which has been claimed as a means of connecting the Northern with the Southern Slavs in a post-bellum rearrangement of territory, would involve the taking over of a purely German population, and has nothing to support it from the point of view of nationality. The South Slav claim, again, to "the Bačka," that is, to Baranya, Bács-Bodrog, and the Banat, he regards as open to the following objections. It would involve the taking over of many German and Magyars, with in some areas only a few Slavs. It would mean the loss to Hungary of an area which probably ranks second in agricultural importance, being only surpassed by the Magyar area on the Alföld. Finally, it implies Slav possession of the lower reaches of the Theiss as well as of the Danube below the Drave confluence. This would affect the use of the rivers as navigable waterways within Hungary.

The Moslem Populations of Russia.—Recently various articles have appeared in the public press on the possible effects of the political

upheaval in Russia on the Mohammedan and Turkish-speaking peoples there, more especially in connection with the so-called Pan-Turanian movement in Turkey. In several issues of *The Near East* abstracts have been given of an article on the Pan-Turanian movement which appeared in *The Round Table*, and the issue for December 28 contains in addition a leading article on the subject which discusses some interesting general points.

The Russian Empire includes a total of under 20 millions of Mohammedans, of which some 16 millions are Turkish-speaking. The latter fall into three groups of very unequal size. The smallest, but intellectually the most important, is that of the Kazan Tatars. Though the centre for this group is the town of Kazan, its members live along the great bend of the Volga from Nijni Novgorod to Samara, and, including the Tatars of Astrakhan, number about a million and a half. They live isolated among other Russian peoples, use Turkish mostly as an adopted speech, and since 1905 have had a measure of freedom for their Press, which has undergone great developments. If Russia can be reorganised as a federal republic, they are probably destined to become the centre of the Turkish-speaking populations of that country.

The second group includes the Tatars of the Caucasus area, which number about two and a half millions, but there are in addition about one and a half non-Tatar Mohammedans here. This group is cut off from the other Moslem communities of Russia by alien peoples, but is only separated by the Black Sea and an artificial land frontier from the Mohammedans of Turkey and Persia. Though less developed intellectually than the Kazan Tatars, this group has the economic advantage of the rich resources of the Baku oilfields. If chaos continues in Russia these Tatars may tend to turn towards Turkey.

By far the largest compact group of Turkish-speaking peoples included in the Russian Empire is that which inhabits Central Asia. These number some twelve millions, and occupy an area between the Volga and Caspian on the west, the line of the Trans-Siberian on the north, and the frontiers of Persia, Afghanistan, and China on the south and east. All belong to the Sunni sect. The whole area was but loosely linked even to Imperial Russia, and the cutting of the Orenburg-Tashkend and Trans-Caspian railways would largely isolate these peoples. Should Russia break up, it seems probable that "German-Ottoman diplomacy can be relied upon to embody it [the area] in a Turkish-Islamic State. The prospects in this direction would amply atone for losses in Southern Mesopotamia and Syria. A Berlin-Bokhara project would take the place of the frustrated Berlin-Baghdad scheme, and there would be an additional incentive for Constantinople to make peace with non-Turkish Islam, and win back the allegiance of the Arabs."

Perhaps we may add that, as has been several times emphasised here, under Russian rule cotton-growing has made great progress in Turkestan. Thus, if Central Asia came indirectly under the control of Berlin, Germany would obtain direct land access to one of the most important raw materials of modern industry.

Economic Geography.

Sources of Potash.—An article on this subject, in *Nature* for January 3, draws attention to a possible new source of supply which may acquire importance in the near future. It has been shown that potash-felspar, with the help of common salt, can be utilised to yield potassium chloride. Large deposits of suitable material occur in Great Britain—in Cornwall, Wales, and parts of Scotland. In the last named there are untouched supplies in Sutherland, where the visible outcrops are estimated to contain 20,000,000 tons of suitable material. It is believed that these deposits could be worked at a profit, and might lead to the development of an important potash industry in this country.

The article goes on to give a somewhat detailed account of the Alsatian deposits near Mulhouse, which have had a considerable amount of attention drawn to them lately. These deposits are deep-seated, lying at depths of from 1600 to 2100 feet, and are very extensive. Only one mine was worked before the war, and the German Government regulated its output artificially in the interests of the Stassfurt mines. Other considerable potash deposits are known to occur in Spain and in Abyssinia. The last are in Italian possession, but till recently their exploitation has been very difficult, owing to the hostility of the Abyssinians.

The question of the sources of potash, especially from the point of view of the industrial utilisation of Scottish felspar, formed also the subject of a lecture delivered by Dr. R. Campbell to the Edinburgh Geological Society lately. Dr. Campbell discussed not only the Ashcroft process of utilising Scottish felspars as a source of potash, but also the necessity for finding felspathic raw material for the enamel, glass, and pottery industries. The results of a survey of Scottish rocks were summarised, and it was stated that, in addition to the extensive beds near Durness in Sutherland, other deposits occurred in other parts of Sutherland and in the counties of Argyll, Aberdeen, Banff, and Kincardine. Potash felspar was mined and ground at Monymusk in Aberdeenshire nearly 150 years ago, and the lecturer stated that there seemed every prospect of the revival of a neglected Scottish industry.

NEW BOOKS.

EUROPE.

La Révolution Russe: À Petrograd et aux Armées (Mars-Mai 1917). Par Claude Anet. Paris: Librairie Payot et Cie, 1917. *Prix* 4 *fr.*

Through the Russian Revolution: Notes of an Eye-Witness. By Claude Anet. London: Hutchinson and Co., 1917. *Price* 6*s. net.*

The events of the revolution in Russia are still too near at hand to permit of any real perspective, and we must accept M. Anet's book for what it professes to be, viz., a series of rapid sketches of the happenings of the early months, from March to May 1917, written from day to day from first-hand knowledge and

personal acquaintance with some of the principal actors in that astonishing drama, and sent off to his paper in Paris, the *Petit Parisien*. Taken as a whole they make a wonderfully vivid picture, and they help us to realise, in a way which nothing else could do, the extraordinary events of that epoch-making time. M. Anet enjoyed the benefit of frequent interviews with M. Kerensky, General Korniloff, General Goutchikoff, the Minister of War in the provisional government, and with others, and he was present at many of the meetings of the Duma and of the Soldiers' Committees at the Taurida Palace. An absurd scene is furnished by the gathering there of the soldiers' deputies, who, amidst much frothy speechifying and votes by show of hands, carried impossible and contradictory resolutions. The account of these Gilbertian proceedings would be amusing reading, were it not that they are typical of so much that is fraught with consequences so tragic for the future of Europe and for the peace of the world.

The rapid progress of the revolution, from the first outbreak on the 10th of March 1917, was as much a surprise to those who took part in it as it was to the looker-on. Like other observers, M. Anet dates the real beginning of the revolution from the shooting of the incredible scoundrel, Gregory Rasputine, who had gained so much influence over the neurotic Empress and her entourage. "L'assassinat de Raspoutine a été le choc initial qui a cristallisé les énergies endormies, et les a fait passer de la pensée à l'action. Aux cinq coups de revolver qui ont abattu Raspoutine ont répondu, dans Pétrograd, les milliers de coups de fusil qui ont renversé la dynastie de Romanof."

It was on the 15th of March that the Emperor, after consulting with his generals, and referring matters to the Duma, came to the decision that the only course left open to him was to abdicate. The manifesto in which he embodied this decision and bequeathed his heritage to his brother, the Grand Duke Michael, is quoted in full by M. Anet, and is touching in the simple dignity of its language. But the people demanded that the Grand Duke also should renounce the Regency, and in his declaration, dated only one day later than the Emperor's, the Grand Duke announced that he bowed to the popular will; and thus, as M. Anet puts it, "La dynastie de Romanof a disparu dans la tourmente. Un coup de vent s'est élevé. Elle n'a trouvé personne pour la défendre. Elle s'est écroulée, comme si toute vie s'était éteinte en elle. L'autocrate, qui régnait hier sur cent soixante millions de sujets, n'a pas vu un homme se lever pour sa cause."

The rise of Russia under the Romanoffs, in extent, in power, and in wealth, is a matter of history. And then, the revolution, which none beyond a few visionaries had thought possible, overturns in a few days the bureaucracy which had taken three centuries to build up.

"Qui a voulu cela? Personne. Dans le mécontentement général des esprits, dans l'énervement produit par deux ans et demi de guerre, dans les souffrances causées à Petrograd par un ravitaillement détestable, souffrances rendues plus vives par la rigueur d'un hiver comme, de mémoire d'homme, on n'en a vu, il a suffit de quelques usines fermées, de quelques milliers d'ouvriers sur le pavé se promenant sur la Perspective Nevski, de mesures de police maladroites et insuffisantes, de l'emploi sans raison de la troupe, troupe composée non de soldats de l'active, bien encadrés, mais de réserves innombrables et mal entrainées, des régiments de la garde, pour amener, un conflit qui, soudainement en une heure, par le passage de ces troupes au peuple, est devenu une révolution triomphante, acclamée de tous et assez forte pour renverser l'empereur et pour détruire l'empire."

We feel tempted to quote at length from M. Anet's vivid scenes of life in the Russian capital, but we must refrain. In a very interesting chapter he describes

the tour of the front which he made in company with Kerensky, whose main object in this visit to the armies in the field was to reanimate the fighting instinct in the soldiers, and to persuade them to carry out the wishes of the provisional government for a renewal of the offensive. Kerensky laboured and spent his strength in speaking to the men. He was received with enthusiasm, but the effect of his addresses was not sufficient to counter the socialistic dry-rot which had set in, and the influence of enemy propaganda. M. Albert Thomas, the French Minister, went also on this mission, and laboured hard to back up Kerensky and to persuade the soldiers to do their duty to the Allies.

M. Anet greatly admires the character and personality of Kerensky. Handicapped by a physique little adapted to withstand the immense strain which he put upon himself, he strove hard to strengthen the action of the provisional government and to bring moderate counsels to bear upon the committees of soldiers and workmen whose half-baked notions and impetuous actions combined to plunge the capital and the country deeper and deeper into the cauldron of confusion and anarchy. As for Korniloff, he says that he is, first of all, a hero, and that he has worked solely for the glory and honour of Russia. In the early days of the revolution he was untiring in his attempts to influence the soldiers and officers, and he had great hopes of restoring the spirit of duty in the army. It may be that, like other members of the new government, he trusted too much to oratory.

We wish that M. Anet had found space in his book to give us his own estimate of the causes which lay at the back of the revolution, and we hope that he may find time for this in a later work. It would be outside of the domain of the present one, which serves its purpose most admirably in drawing a living picture of the early days in Petrograd, and we have no doubt that it will be widely read.

The translation of M. Claude Anet's book differs only from the French edition in having a number of photographic illustrations. The translation seems to be, on the whole, well done, and reproduces the original in terse English. We notice, however, some strange omissions or mistakes, due no doubt to haste. To take two examples. The translator says (page 199), "Our men are not going to fight for Constantinople . . . for the English, or Alsace-Lorraine for the French, they will attack like lions." The original reads, "*When our men know that they are not going to fight*," etc. ; and the words omitted are required to make the sense clear. Again, at page 223, the translator says, "The old army of the Tsar accomplished great deeds by which Russia *was never ennobled*." Original reads, "L'ancienne armée du Tsar a accompli des prouesses *dont la Russie est ennoblie à jamais*," which is the reverse.

Hill Views from Aberdeen. By G. Gordon Jenkins, M.Inst.C.E. Preface by Viscount Bryce, O.M., D.C.L. Aberdeen: D. Wyllie and Son, 1917.

"The mountain and the flood" have set their mark on all good Scotsmen. There is no important centre of population even in the industrial districts that is not within easy hail of impressive mountain scenery. In his Preface Viscount Bryce makes one exception—unnamed, lest susceptibilities should be wounded! but it is difficult to fix accurately the reference. Noble panoramas unfold themselves from all the great cities or their immediate neighbourhood, but still grander scenes from strategic points like Stirling, Perth, and—perhaps most wonderful of all—in the descent from Culloden into Inverness.

Aberdeen, to which this little volume is devoted, has a character all its own. On the immediate south of the Dee, the Grampians run right down into the sea by Girdleness Lighthouse. From that point they mount in successive terraces

and chains to Cairnmonearn, Kerloch, Cairn o' Mount, Clochnaben, Mount Battock, Mount Keen, Morven (an outlier), Lochnagar, and then into the huge *massif* of the central Cairngorms—Ben Muich Dhui, Cairngorm, Braeriach, Cairntoul, with the eastern flanking range of Ben Avon and Ben a' Buird. Cairngorm itself is the eponym of the Aberdeen Mountaineering Club, the oldest in Scotland, though still in the vigour of youth.

Mr. Jenkins has rendered distinct service to Scottish mountaineers in general, and to Aberdonians in particular, by his present contribution, for the most part a series of reprints. Chief interest centres in the article on "Curvature and Refraction," reprinted from the *Cairngorm Club Journal* of July, 1917. Allowance has, of course, to be made for the curvature of the earth in determining whether a certain peak is by any possibility visible from any given elevation, especially when heights intervene in, or almost in, a direct line. Refraction is to a certain extent a counteractive, but varies so much with the state of the atmosphere, and even the time of day, that it is by no means a reliable factor. Mr. Jenkins works out the combined effect on the panorama from the Blue Hill, a favourite viewpoint a little south-west of the Bridge of Dee. The result is figured in an appended diagram, and a useful table is given of the actual allowances to be made for curvature and refraction combined at all distances from 1 to 90 miles. The volume also contains an account of the installation of the mountain indicator on Brimmond erected to the memory of those from the Newhills district who have fallen in the war; and a description of the view from "the Covenanters' Faulds" (close to the Bridge of Dee) and Carmaferg (near Aboyne), with a few other details.

Mr. Jenkins combines the technical with the æsthetic interest, and incidentally shows that, far from antagonism, the strictest correlation may exist between science and art. He rather naïvely laments, as most of us have cause to do, that his powers of expression do not match his appreciation of the beauty of mountain scenery, or the depth of his admiration and wonder. He is a safe and wise guide, and his little book may be commended to all interested in mountain views—and who is not?

EDUCATIONAL.

A Brief Introduction to the Study of Regional Geography. By H. D. Sutherns, B.A. Durban: T. W. Griggs and Co. *Price* 1*s. net.*

The old and conventional way of studying the geography of the world by following its divisions into political units is gradually being rejected for the more scientific method of dividing it into a number of natural regions or large divisions based on the common set of conditions throughout each unit that affect man's life and character, his occupation and his outlook. In selecting these natural regions the chief factor to be considered is natural vegetation—man's life ultimately depending upon the productions of the soil. In this little book the author summarises in a series of short chapters the climatic influences that determine plant life, and then divides the world into ten natural regions, adding short notes on each region under the heads of climate, distribution, scenery, resources, animal life, and human settlement. The concluding chapter consists of notes on the principal vegetable productions of the world. The book is no more than a collection of heads or notes of lessons, which should be of value to the busy teacher by giving him, in cheap and handy form, the skeleton framework, to be filled in and supplemented in his class lessons. The book should also be of use to the student for revision purposes. Two diagrammatic schemes and a map of the climatic regions of the world add to the usefulness of the work.

BOOKS RECEIVED.

Germany, 1815-1890. By Sir Adolphus William Ward, F.B.A., Litt D., Master of Peterhouse, Hon. LL.D., Litt.D., Ph.D. Volume II., 1852-1871. With Sections by Spenser Wilkinson, M.A., Chichele Professor of Military History, Oxford. Crown 8vo. Pp. xvi + 588. Cambridge: at the University Press, 1917. *Price* 12*s. net.*

Around the World with the Children. An Introduction to Geography. By Frank G. Carpenter, Litt.D. Demy 8vo. Pp. ix + 133. New York: American Book Company, 1917. *Price* 60 *cents.*

La Tunisie. By J.-L. de Lanessan. Deuxième édition, revue et mise a jour avec une carte en couleurs. Demy 8vo. Pp. vi + 308. Paris: Librairie Félix Alcan, 1917. *Price* 5 *fr.*

De Québec à Valparaiso: Paysages—Peuples—Écoles. By Henri Goy. Crown 8vo. Pp. 287. Paris: Librairie Armand Colin, 1917. *Price* 3 *fr.* 50 *c.*

The Story of the Salonica Army. By G. Ward Price, the Official Correspondent with the Allied Forces in the Balkans. Crown 8vo. Pp. xiii + 298. London: Hodder and Stoughton, 1918. *Price* 6*s. net.*

Heaton's Annual: Commercial Handbook of Canada. Fourteenth Year, 1918. Toronto: Heaton's Agency, 1918. *Price* 5*s.*

La Défense Nationale de 1792 *à* 1795. By Pierre Caron. Crown 8vo. Pp. vi + 105. Illustrated by 6 Engravings. Paris: Librairie Hachette et Cie, 1912.

Round about the Torres Straits: a Record of Australian Church Missions. By the Right Rev. Gilbert White, D.D. Crown 8vo. Pp. viii + 95. London: Society for Promoting Christian Knowledge, 1917. *Price* 2*s. net.*

Okeanographia. By Jules de Schokalsky. In Russian. Royal 8vo. Pp. xiv + 614. With many Maps, Diagram, and Illustrations. Petrograd, 1917. *Price* 16 *roubles.* *Presented by the Author.*

Norsemen's Route from Greenland to Wineland. By H. P. Steensby. Copenhagen, 1917.

Some Results of a Survey of the Agricultural Zoology of the Aberystwyth Area. By Chas. L. Walton, M.Sc. (Wales).

The Liver Rot of Sheep, and Bionomics of Limnæa Truncatula in the Aberystwyth Area. By Chas. L. Walton, M.Sc. (Wales). Reprints from *Parasitology*, Vol. x., No. 2. December, 1917. Cambridge: at the University Press.

La Végétation du Paraguay. Résultats Scientifiques d'une Mission Botanique Suisse au Paraguay. Par R. Chodat. Avec la collaboration de W. Vischer. Deuxième Fascicule. Genève, 1917.

Boletines de la Oficina Meteorologica Argentina.—Junio de 1914, No. 4: La termodinamica de la atmosfera terrestre desde la superficie hasta el plano de desvanecimiento, por Francisco H. Bigelow, A.M., L.H.D., Profesor de Meteorologica. Octubre de 1914, No. 5: Resultado de las observaciones del magnetismo terrestre (con cuatro mapas), por Luis G. Schultz. Encargado de la sección magnetica. Buenos Aires, 1914.

Anales de la Oficina Meteorologica Argentina, por su director Gualterio G. Daris. Observaciones de las Islas Orcadas en los Años 1905 á 1910. Parte I., tomo xvii.: Clima de las Islas Orcadas del Sud. Parte II., tomo xvii. Buenos Aires, 1912-1913.

Servico Meteorologica Argentino: Historia V.: Organizacion con un resumen de los resultados. Preparado bajo la dirección de Gualterio G. Daris. Buenos Aires, 1914. *Presented by R. C. Mossman, Esq.*

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

THE PROBLEM OF ALSACE-LORRAINE.[1]

By MARION I. NEWBIGIN, D.Sc.

(With Sketch-Maps.)

SURFACE AND SOILS IN ALSACE AND LORRAINE.

THE preceding sections have shown us the general position of Alsace and Lorraine. The next point is to consider the nature of the surface in the two areas, and the modes of land utilisation practised.

First, however, we must define our terms, for the Reichsland is but a mutilated part of a larger territory, and its present boundaries were set by the arrogance of a conqueror flushed with victory. Historically, the two regions known as Alsace and Lorraine were for long isolated from one another by the forests which clothe the grits of the Vosges and of the adjacent regions. Not, as Professor Vidal de la Blache points out, till the establishment of industries on the great scale did the two become closely linked.

Lorraine is a term which has had very varied significance in historical time. Practically, however, it may be simply defined as the region between the forests of the Vosges area and the Meuse; or, in other words, as the area drained by the Moselle up to the point where that river breaks through the Rhine Highlands. If its eastern margin be taken as the crest of the Vosges, its western as the Meuse and its scarp, then it may be said to extend northwards to the slopes of the Ardennes, and southwards to the Faucilles, the low hills which, through the plateau of Langres, link the Vosges to the Central Plateau. The boundaries are thus, broadly speaking, forest-clad uplands, which in earlier days presented a great obstacle to intercommunication.

[1] Continued from p. 90.

The territory so defined consists of two parts, an eastern high plain, or plateau, floored by tenacious marls, or sometimes by masses of coarse débris brought down by the Vosges, and a western land of terraces and plains, formed of hard limestones alternating with softer calcareous beds or with clays (Fig. 4). To-day plateau and terrace-land alike are divided politically between France and Germany; for, as we have seen, northwards the Reichsland extends to the Côtes of the Moselle, and thus includes the whole of the eastern plateau region and a part of western Lorraine, while farther south, where the boundary is carried along the Vosges, the French hold both the eastern and the western section.

Alsace (Fig. 3), from one point of view, may be defined as the tract between the crest of the Vosges and the Rhine, its northern limit being the forest belt which stretches, on the left bank of the river Lauter, almost from the Vosges to the Rhine, or nearly from Wissemburg to Lauterburg, and its southern the low sill, in part wooded, in part swampy, which separates the factors of the Doubs and thus of the Saône from those of the Ill. Historically, however, it is truer to say that Alsace is at least largely the valley of the Ill, for it is the fertile belt of land on the left bank of that river, a belt widest opposite Strasburg, which formed the historical nucleus of the country.

The first definition seems to make Alsace half of the upper part of the great Rift valley of the Rhine, and thus to suggest that it has no unity of its own. By emphasising the importance of the Ill we bring into prominence the supremely important fact that the Rhine, especially between Bâle and Strasburg, is a line of separation, and not, like many rivers, a link between the peoples of its banks. Between these two towns the river remains rapid, almost torrential. Its course, in earlier days especially, before the establishment of training works, was constantly changing; its banks are liable to flooding, while the valley floor in its vicinity is sometimes marshy, sometimes of coarse alluvial material, and thus generally of little use for agriculture. In the neighbourhood of the river, therefore, the surface tends to form desolate *landes* or woods. On the left bank of the Ill, on the other hand, there appears, especially west of Strasburg (Fig. 3), that fertile soil known as loess, the soil *par excellence* on which wheat grows well. Further, the steep faulted edge of the Crystalline Vosges bears what the French call vividly "packets" of those younger rocks which have been stripped off the summit levels. Here, therefore, limestone rocks appear over limited areas, and, thanks to the dry and sunny climate, due to the eastward slope, the vine flourishes amain. Wheat, fruit-trees, and gardens on the loess terraces; vines on the hill-slopes; cattle grazing on the *landes*; pigs feeding in the forests; wood in abundance; a share in transit trade due to a wonderful position on intersecting highways: these are the causes which led to the development and prosperity of the unit of Alsace. As in Burgundy, the natives have long had the reputation of being fond of the good things of this life; they themselves have always prided themselves on the abundance which their land produces. "They love," says Professor Vidal de la Blache (*La France de l'Est*, Paris, 1917) to depict themselves, as in certain old engravings, leaning against their sacks of wheat." One

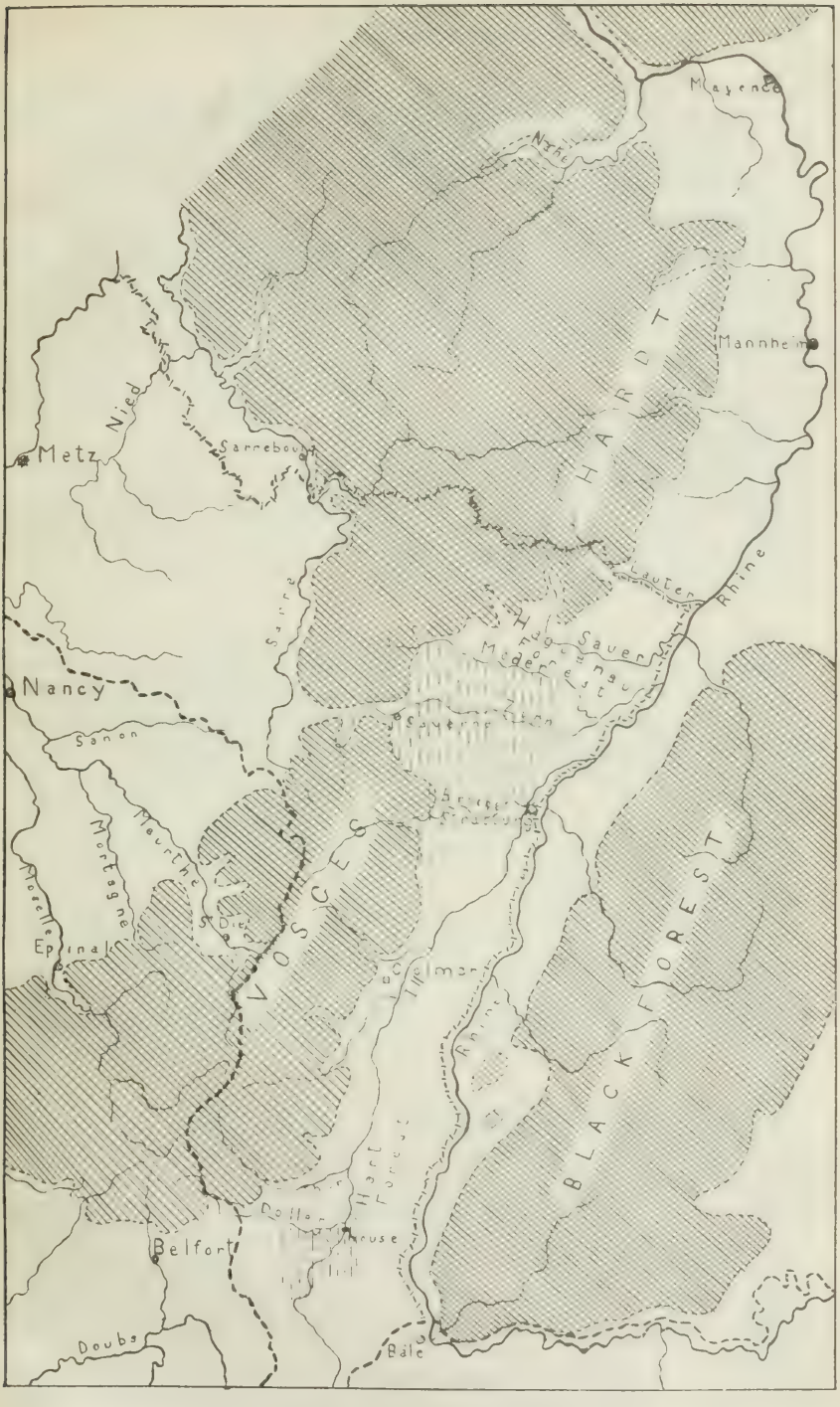


FIG. 3.—Sketch-map of Alsace and Eastern Lorraine.

The oblique shading indicates the more elevated areas, while the patches of vertical shading show, quite diagrammatically, the chief deposits of loess. Scale about 1 : 1,500,000.

– – – – boundary in 1914. ⊣⊣⊣⊣ boundary in 1870. (*In part after Barré.*)

should add, perhaps, that with all the rest their land produces tobacco in abundance, and hops, so that we may add the pipe and the beer mug to the picture. On this basis of material prosperity has been built a civic tradition, an idealism, a mental attitude of which the Alsatians are profoundly conscious.

Alsace is truly a land of promise to the denizens of poorer lands, and one which they have always sought. So much is this the case that the jest of which the Alsatian never tires is that which represents the incoming Prussian as gorging himself on the—to him—rare luxuries of the Reichsland, trampling on traditions and ideals which to him mean nothing. Hansi's delightful picture of the divinity student from Königsberg stealing grapes in an Alsatian vineyard is but one form of a joke which never loses its savour locally. The pre-war Saverne incident, the policy of frightfulness during the war, may, from one point of view, be regarded as the Prussian response to the French view that the German has only to be depicted to be recognised as a ludicrous anachronism in a civilised world. The problem whose working-out we are witnessing to-day is whether at this stage of history irony, or poison gas and the submarine, is the stronger weapon.

Beginning at the west, we may note that the summit levels of the Vosges, as already stated, form high pastures or bogs. The slope are densely wooded, beeches mingling their lighter foliage with the firs. Lower, based upon the patches of calcareous rocks already described, comes the belt of vineyards, which reach their greatest development in the tract which stretches from Thann, where the Thur leaves the mountains, to Mutzig, near where the Bruche emerges. Throughout this belt, Professor Vidal de la Blache points out, the vine is as characteristic as it is at Épernay or at Beaune. Vineyards also, however, appear elsewhere where limestones crop out.

Below the hills which bear the vineyards comes the loess belt, but this is far from being continuous even at the base of the mountains, and, further, sometimes appears on the plain. In the latter, however, it has only been preserved in patches. Most conspicuous of these are that lying between the Doller and the Ill, south-west of Mulhouse, and that lying between the Ill and the Hart Forest, east of the same town (see Fig. 3).

The loess belt which fringes the base of the mountains is narrow and interrupted in southern Alsace. Not till we pass to the north of Schlestadt (Schlettstadt) does it become important. Still farther north, in a belt extending from the river Bruche to the borders of the great Hagenau Forest, and from the vicinity of Saverne to the very outskirts of Strasburg, it extends over a wide area. Here it reaches almost from the Vosges to the Rhine; here the towns and villages cluster close together over the terraces in which it is arranged. The population is predominantly rural, for the land produces abundantly and is fully utilised.

Note the exact position of this fertile belt. It lies just opposite the Col de Saverne, that great opening leading to Nancy and to Paris. Here

also the Vosges approach the Rhine, and the porous loess, whose surface is but scantily supplied with streams, gives firm ground for road and rail, in contrast to the marshy tracts which elsewhere mark the borders of Rhine and Ill. Here, then, is a convenient crossing-place. Once across the Rhine, the main line of communication runs north-eastward till by Karlsruhe it can emerge from the Rhine Rift and pass eastward to the Danube. Strasburg also, as already suggested, marks the point where the Rhine begins to be easily navigable. The town itself, therefore, placed near the junction of Rhine and Ill, has many advantages of site, and its strong French sympathies are comprehensible when one remembers the importance of the Col de Saverne, the greatest breach in the western wall of the Rhine Rift.

The rest of the plain of Alsace is in large part covered by alluvial deposits, due to the Rhine or to the torrential streams which pour down from the eastern slopes of the Vosges, and fling down their load as they emerge on the plain. Variations in the characters of these deposits, combined with climatic causes, account for three main types of vegetation which occupy their surface. East and south east of Thann, beyond the narrow loess belt, the Doller and the Thur have laid down beds of gravel and pebbles, through which water passes freely. These deposits are not easily cultivated, and the presence of drying winds prevents woods growing freely. Here, then, we have stretches of pasture-lands, mingled with thickets.

Farther north and east similar gravel beds are mostly clothed with forest. Many of these forests of the plain are still almost untouched. In Upper Alsace the most extensive is the great Hart Forest, on the left bank of the Rhine. In Lower Alsace the largest is the Hagenau (Fig. 3). Both are unfavourable to human settlement.

The gravels of the plain are generally underlain by impermeable beds, which make it always possible to obtain water from wells, even if the surface appears dry. Nowhere, in point of fact, is the water-table far below the surface, and it is especially near where the Ill runs for a time almost parallel to the Rhine before joining it. The appearance, therefore, of a bed of impermeable clay is enough to cause the superabundant ground-water to appear at the surface. Between Colmar and Schlestadt, especially, the surface is marked by a number of minor streams, running parallel to the Ill, forming as it were natural ditches (*Graben*) in the plain. Here, then, the surface takes on a new form, becomes not pasture-land or forest, but marsh—*Ried* in German, because of the characteristic vegetation. It is this marshy belt between Colmar and Schlestadt which is the basis of the German division into Upper and Lower Alsace, as it was of the French division into Upper and Lower Rhine; for the belt marks an old and natural line of separation.

The parallel streams near Schlestadt have another influence on human life. In making the crossing of the plain here difficult, they tend to cause lines of communication to run north and south rather than across the plain, and they help therefore to accentuate the importance of Strasburg, as the point where transverse communication is easy over the permeable loess.

Marshes of similar type, if with less well-marked parallel streams, tend to occur both along other parts of the Ill and at the sides of the Rhine. The historical separation between Baden and Alsace is due, not only to the consequent difficulty of crossing the river, but, perhaps even more, to the relative unsuitability of the river margins for human settlement. In both cases the centre of gravity was thrown back to the loess belt near the bounding walls of the Rift valley; the river plain, with its marshes and its forests, its relatively infertile lands, repelled rather than attracted.

If this description has been followed in detail, it should also be obvious that, as a necessary consequence of the shape of Alsace, and of the peculiar distribution of loess areas, forests and marshes, no less than of its relation to surrounding areas, great centralisation is not possible. Strasburg is the largest town, but it is far from dominating the whole. Colmar, near the mouth of the Fecht valley, if little more than a quarter of the size of Strasburg, is historically important, while Mulhouse is a large manufacturing town, with some 95,000 inhabitants, as against about 50,000 in Colmar, and about 180,000 in Strasburg. But even apart from these three cities, the presence of areas of great productivity, alternating with less favoured regions, has always made Alsace a country of strong local patriotism. The Alsatian neither tends to emigrate from his native country—save under the pressure of alien rule, nor is the tendency to migrate from country to town so marked as it is, for example, in Germany proper.

We must next summarise in a similar fashion the general characters of the surface in Lorraine.

One important difference between the two countries, in regard to which it is well to be clear at the outset, relates to their respective mineral wealth. Alsace has large deposits of potash, found in the vicinity of Mulhouse, and not yet fully exploited. There are also deposits of petroleum, not of very great importance, in Lower Alsace, near Pechelbronn; broadly speaking, however, Alsace is poor in minerals. The wealth of the country consisted primarily in its rich loess terraces, which are at once productive and easy to work. Secondarily, the country has acquired much wealth through the development of industry, especially in Upper Alsace, where Mulhouse is a very important cotton centre. The manufacturing industries originated, like those of Yorkshire, chiefly on the basis of abundant water-power. Though the country is less fortunate than Yorkshire in having no coal beds of any note, the fact that by river, by canal, by land routes, it has easy access to the Rhine coal-fields, has led to great developments, especially since the German annexation.

Matters are very different in Lorraine. With certain exceptions, the agricultural lands are not highly productive, and the soils are usually heavy, demanding much labour from man and beast. Further, the position on the wet side of the Vosges makes the climate less favourable to plant growth. But, unfortunately for peace, the country is rich in minerals, the iron ore especially having been one of the motives which led the Germans, despite the warnings of Bismarck, to draw their frontier much farther to the west than seemed to that statesman prudent. The

frontier was drawn deliberately in the hope and with the intention of including all the best iron fields. But it is a part of the nemesis of stealing Naboth's vineyard that the successful thief no sooner enters upon his stolen lands than he discovers that its original owner retains some olive grove or cucumber garden which seems essential to the rounding off of the new possession. That one of the motives of the present war was the desire to seize the fragments of mineralised land left behind at the last annexation, the French at least have no doubt. The German lust for their neighbour's lands has, indeed, been greatly stimulated by the fact that it has been found that round Briey iron of very good quality can be worked, in an area where, in 1871, only refractory ores were thought to occur.

In addition to iron, salt occurs on a large scale in the Triassic marls of the Seille valley, this salt being extensively used in the German chemical industry. Further, the Saar coal-field, lost to France in 1815, has been shown to be continued across the present frontier into French Lorraine, at workable depths, while it occurs, nearer the surface, in territory which was French till 1871. The ownership of the Lorraine iron beds, and the question of access to the Saar coal or to Westphalian coal, together constitute a very difficult economic problem which will have to be faced at the settlement. The iron beds, if access to coal be denied, are of relatively little value, and France proper is poor in coal. It is worth emphasis that the iron occurs in the purely French-speaking parts of Lorraine, and that for German industry those iron beds are of enormous importance.

The geological map, forming Fig. 4, indicates the general characters of the rocks of Lorraine.[1] As already explained, the eastern part is floored by Triassic rocks, the western by Jurassic. In contrast to the Triassic beds of England, which consist of a Lower group of sandstones and grits and an Upper of salt-containing marls with thin beds of sandstones, those of Lorraine have a Middle group of limestones (Muschelkalk). The latter are not separately shown on this sketch-map, but they have some effect on the scenery and the products.

It will be seen that the coarse sandstones of the Lower Trias fringe the High Vosges to the west, and constitute the Low Vosges, continued into the Hardt mountains to the north. They also swing round the old rocks of the Rhine Highlands in a narrow belt. Now these grits are everywhere clothed with forest, or were originally so clothed. Thus, to east, to north, and partially to the south, Lorraine is forest-fringed, this forest having been a great barrier to free communication with surrounding lands in earlier days. Only at the Col de Saverne, where the grits thin out, was there originally a gap in the encircling forest, a fact which accentuated the importance of the pass in earlier days. Almost due north of Saverne, another thinning of the belt of grits, less marked, allowed relatively easy exit from Lorraine at Bitche. There are other natural highways to the north.

[1] For details see *L'Architecture du Sol de la France.* Par le Commandant Barré. Paris, 1903.

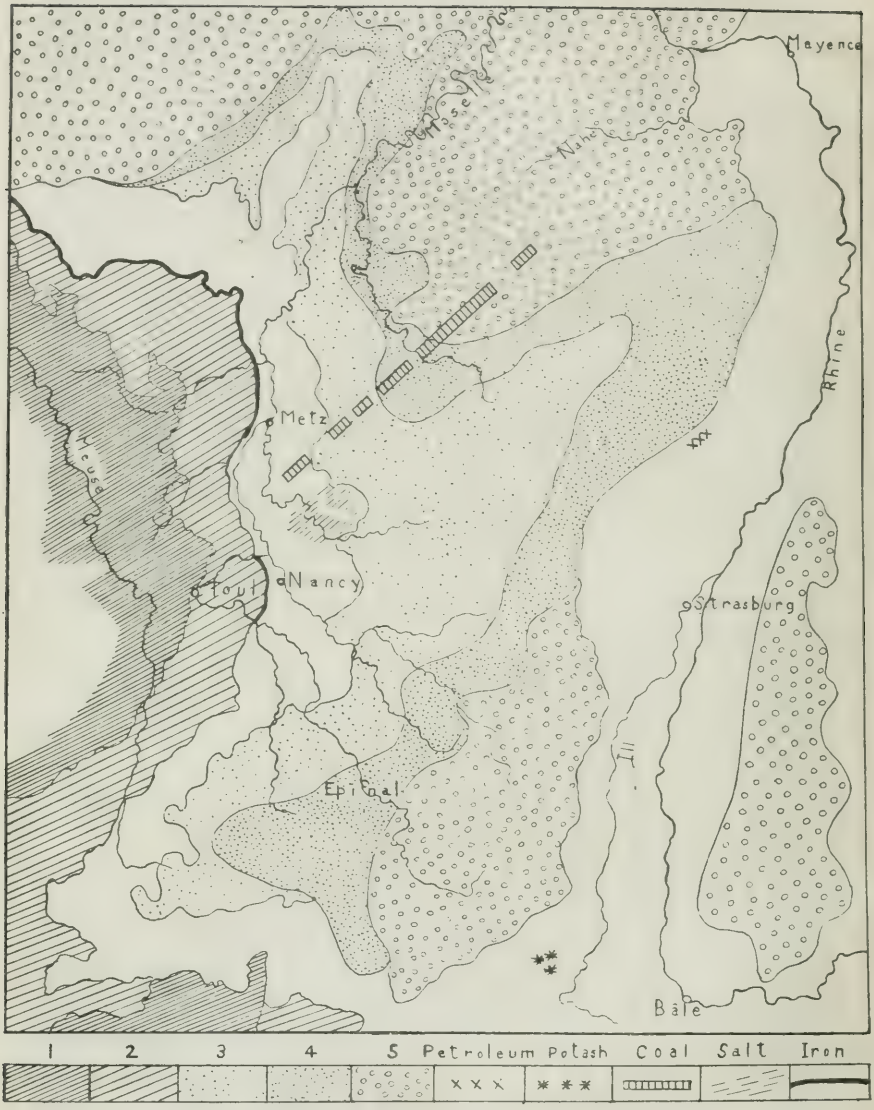


FIG. 4.—Geological Sketch-map of Alsace-Lorraine.

1. Upper Jurassic clays and limestones. 2. Middle Jurassic clays and limestones with the iron-containing beds at their base, shown by the black line. 3. Triassic marls and limestones. Between these and the Middle Jurassic limestones lies the Lias clay, left white on the map. 4. Triassic grits. 5. Ancient sedimentary or crystalline rocks of the Vosges, Black Forest and Rhine Highlands. The Rhine Rift Valley is chiefly floored by recent deposits, and is left blank on the map, but patches of Triassic and Jurassic rocks occur at its margins. Scale about 1 : 2,000,000. (*In part after Barré.*)

All this forest belt was originally scantily peopled. Its inhabitants were poor, eking out a livelihood by many minor industries, mostly depending upon local products in some way or other, and by hiring themselves out as labourers to the farmers of the lands farther west. The creeping up of the population by means of the valleys to the upper parts of the Vosges, and the development of important industries in these valleys, were late developments. They were associated with a similar development of industry from the Alsace side, and formed a factor in promoting intercourse and understanding between the two countries.

The next belt is the plain of Lorraine proper. Eastwards lie the limestones of the Middle Trias. These are fertile, owing especially to the phosphates which they contain. Woods are here comparatively scanty, and the land is given up largely to cereals. But this belt is narrow. Beyond it comes the region floored by the Upper Triassic marls, rich in salt, especially near Château-Salins, but forming heavy, wet soils, difficult to plough. Here belts of forest occur, mingled with ponds resembling the meres of Cheshire. In consequence mixed farming prevails, the land is much divided, and the peasant, who can obtain a living only at the price of much toil, tends to be "dour" like a Scotsman or a Yorkshireman, and for a similar reason. He is thus markedly contrasted with the lively Alsatian.

With these marls the plain of Lorraine ends; beyond, the alternation of Jurassic clays and limestones gives rise to a land of terraces, of scarps alternating with valleys or plains. The valleys are often fertile, this being especially true of that, floored by Lias clay, in which the Moselle flows for a part of its course. The calcareous beds, on the other hand, tend to be infertile, forested, waterless. But the rapid alternation of the two is important, and the most favourable conditions, alike for human habitation and for agriculture, lie at the junction zone. Thus Nancy and Metz, the two important towns of Lorraine, are situated, as already indicated, at the base of an outcrop of hard limestone, where this meets the Lias clay. Rain water percolates through the porous limestone and gushes out in copious springs where it encounters the underlying clays. The clays can be ploughed and produce cereals, the limestone hills bear vineyards and many kinds of fruit trees, the river forms a natural highway. Here, then, is the heart of Lorraine, as the loess belt is the heart of Alsace; the two, as Professor Vidal de la Blache says, turn their backs on each other.

West of Metz lies the Woëvre plain, where a mixture of clays and limestones gives fertile soil, while this in its turn is limited westward by the hills of the Meuse, wooded and generally similar in character to the corresponding hills of the Moselle.

One other point is worth note. Over the Triassic beds of the plain of Lorraine the streams flow in their "natural" direction, down the slope of the Vosges. But once they reach the Jurassic area the great difference between limestone and clay asserts its influence, and, as already indicated, the great rivers turn northwards, abandoning that original westward direction which would have brought them to the basin of Paris.

We may add, for the sake of comparison with the towns of Alsace, that Metz, with its suburbs, has a population of over 100,000, and Nancy, which has increased greatly since 1871, owing to immigration of the inhabitants of the annexed departments, has, with its suburbs, about 140,000. The two towns have a similar position at the base of the oolitic escarpment, and both have strategic importance, and form natural centres for the agricultural products of the rich valley around them. Metz probably originally owed its importance to the salt trade, for it is placed near the point where the Seille joins the Moselle. We have already seen that the chief salt beds lie round this valley. The Seille enabled the product to be carried to Metz, whence, by the Moselle and by land routes, it could be distributed over a wide area. To-day the part of the salt deposits left within the French frontier of 1871 feeds the soda and chemical industries of Nancy, and Metz has become primarily a garrison town. Nancy has a number of other manufactures in addition, and its local iron beds (at Maron in the Moselle valley, south-west of the town), in addition to those of Briey to the north, account for an important iron industry.

The Iron Deposits of Lorraine.

The great international importance of the iron ores of Lorraine makes it necessary to add to the above description a short account of these. The subject has received a considerable amount of publicity recently, so that it need not be discussed in full. For more detail reference should be made to the works mentioned below, especially the first.[1]

From our standpoint the two essential features are first the distribution of the beds, especially the fact that they lie close to the present (1914) frontier; and second their characters, as tested by their capacity for ready utilisation as a source of iron and steel. In regard to the second point, the fact that their value, as estimated by experts, has changed since 1871 has a considerable bearing, as we shall see, on the problems of the present war.

Taking the distribution first, we have to note that the ores occur in Lower Jurassic beds at the horizon where these overlie the Lias clay. Now since, as has been already explained, these limestones form a scarp above the softer clays on the left bank of the Moselle, it is clear that the iron-containing beds will crop out at the surface near the base of the scarp. The position of those of the outcropping beds which can be worked is shown quite generally on Fig. 4 by a black line. It will be noted that they are divided into two very unequal parts, the northern and larger being separated by a gap which extends from Mars la Tour (just west of Metz) to Dieulouard on the Moselle (just south of Pont-à-

[1] *L'Allemagne et le Fer: Les Frontières Lorraines et la Force Allemande.* Par Fernand Engerand. Paris, 1916.

France-Allemagne. Par L. de Launay. Paris, 1917.

The Iron Resources of the World. Presented to the Eleventh International Geological Congress, Stockholm, 1910. Two volumes and accompanying atlas, Stockholm.

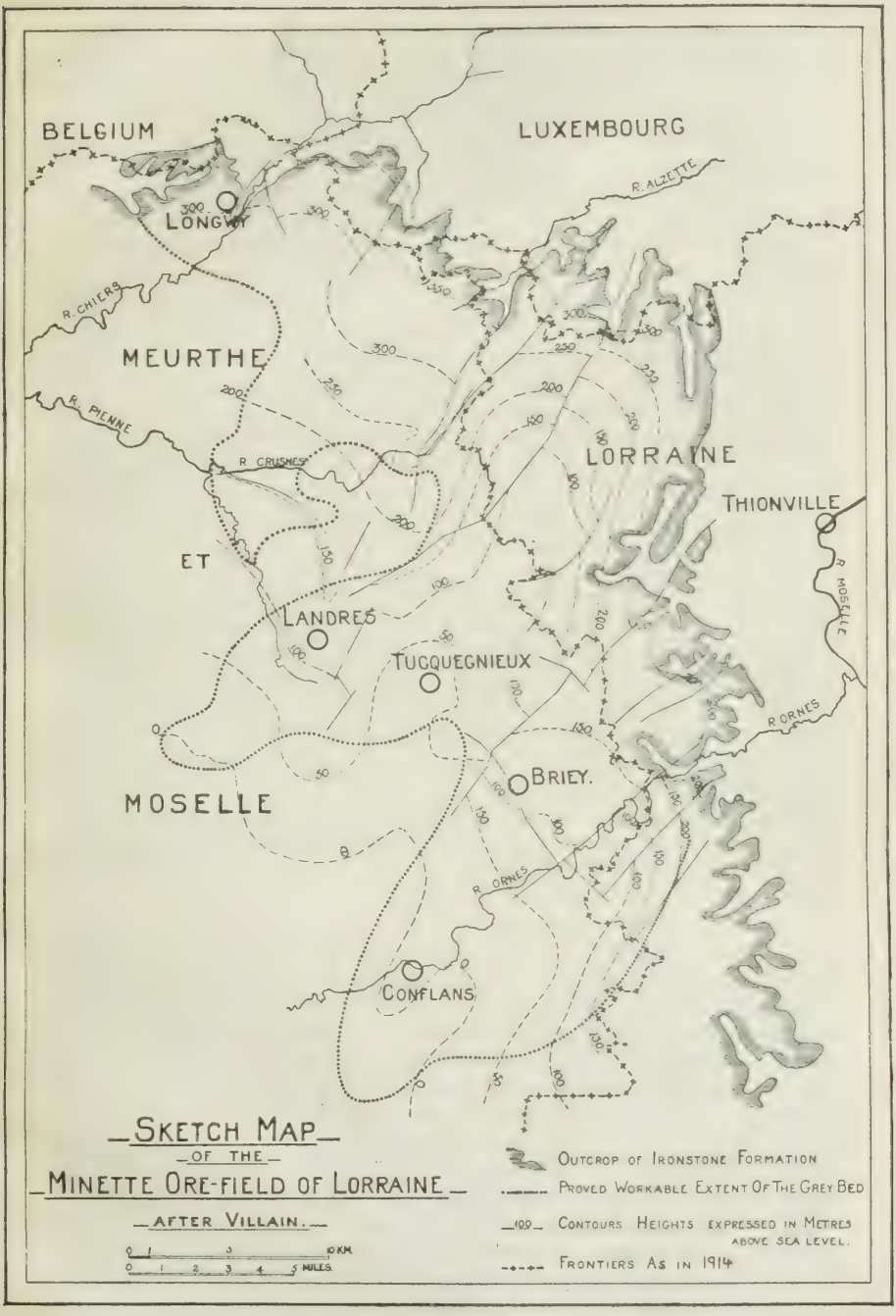


FIG. 5.—The Iron Deposits of Northern Lorraine.

Mousson), from the smaller southern part lying to the west of Nancy. The next point is that the outcrop, after running due north of Metz, turns sharply westward, so that the beds are continued into Luxemburg and France, and then die away within the Belgian frontier (Fig. 5). In detail the course of the frontier of 1871 was so arranged as to include all the iron mines which seemed to the conquerors at the time to be of some value, the only notable exception being the Longwy mines near the western extremity of the outcrop, and those of Villerupt, close to the present frontier, conceded to the French by Bismarck at the last moment.

If Fig. 4 be compared with Fig. 5, which shows the limits of the area in which the iron beds can be worked in the northern part of the field, *i.e.* excluding the small Nancy area, some other points are apparent. It will be remembered that the limestone beds are dipping gently westward towards the Paris basin. Obviously, then, while the iron only crops out at the surface in the region just described, and in the river valleys, especially that of the Orne, it can be reached by deep mining much farther west, for it is here present beneath the overlying limestones. The question whether these deep deposits have any commercial use depends upon two factors—the cost of shaft-sinking, and the value of the ore when found.

Now it was for long believed that the peculiar iron ores of Lorraine, called *minette* by geologists, could only be utilised where they were exposed at or near the surface, and had in consequence undergone a process of oxidation. This is the general experience, for example, in England, where similar ores occur in Cleveland and Northampton. Careful prospecting in French Lorraine, however, carried on between 1882 and 1896, disclosed the unexpected fact that ore of very high quality occurs in the region round Briey—within the present frontier of France. This ore is both valuable and abundant, and the area now forms by far the most productive part of the French iron field of Lorraine. Farther west the ore lies apparently too deep to be won—round Verdun, for instance, it is only reached at a depth of about 2000 feet.

A few words may be added as to the characters of the ore. This is phosphorus-containing, and until the invention and subsequent perfecting of the Thomas-Gilchrist process (1875-8) was regarded as of little value; it is still somewhat despised by English ironmasters. Both the Germans and the French, however, and especially the former, have utilised the minette in steadily increasing amounts in recent years, and the Germans have largely built their dominance in iron on the use of these ores. Under such circumstances the fact that their victims in 1871 have been shown to retain a number of valuable beds is naturally a bitter thought, and the famous manifesto of the six great associations of Industry and Agriculture, presented to the German Chancellor on May 20, 1915, stated with great simplicity that "the security of the Empire in a future war imperatively demands the possession of all the minette mines." This time, the Germans are determined that Naboth shall keep no fragment of valuable property!

In the French books already named, a full account of the German

claims and of their bearing on economic problems will be found. All that is necessary here is to add a few figures to emphasise the importance of the minette fields.

In 1913 Germany produced 28·6 million tons of iron ore, and of this total the beds in annexed Lorraine supplied 21·1 million tons. In the same year she imported from abroad 14 million tons of ore in addition. This is approximately the annual output of the Briey mines.

In France in 1913 the production of iron ore was 21·7 million tons, of which 19·5 million tons was raised in French Lorraine. This figure was made up by over 15 million tons from the Briey district, and over 4 million from the Longwy and Nancy beds, the former predominating. The figures emphasise the importance of the Briey mines, and it may be added that it has been definitely stated in Germany that the possession of Verdun is essential in order that these mines may be rendered easily defensible when—and if—they pass into permanent German possession. It should be added that, as has often been pointed out, the iron industry of France is greatly handicapped by that country's poverty in coal.

It is also handicapped by the absence of a surplus population available for the purposes of industry and mining. In this connection it is worth note that the iron industry of Lorraine, both French and Annexed, is largely carried on by alien labour. The first sources of this labour were the industrial populations of Belgium, Luxemburg, and Germany, but these proved inadequate, and before the war Italian labour was largely called upon, supplemented by some Polish. Professor Vidal de la Blache (*La France de l'Est*) states that in 1910 it was estimated that Annexed Lorraine contained nearly 24,000 Italian workmen, and the French iron field of Briey nearly 21,000. Another point of some importance is that, partly, no doubt, owing to the greater industrialisation of Germany, a number of the iron mines within the French frontier were before the war being developed by means of German capital; in other words, further annexations were being prepared for by methods of "peaceful penetration."

Summary.

It will be apparent from the above description that Alsace was in origin a land favoured by its dry and sunny climate, and by its tracts of very fertile soil. Further, in addition to the cereal-producing loess belt, it contains soils of so varied a nature as to ensure abundant supplies of the chief agricultural products of temperate climates, including wine. In 1871 the population was chiefly German-speaking, as was indeed to be expected from the geographical position. But the people differed then, as they differ to-day, from the typical German, and more especially from the Prussian—differed in traditions no less than in temperament and mode of life. The moral attachment to France postdated the political one, for the bonds were only drawn tight as a result of the French Revolution, which found an instant response in the valley of the Ill. The later industrial revolution has led to a great development of industry in Alsace, and that this has been stimulated by inclusion

within the German Empire cannot be denied. But the obvious material advantages of the inclusion have not succeeded in reconciling the Alsatians to it, and the methods employed by their new rulers have been uniformly unsuccessful.

Lorraine was originally an almost forest-girdled tract. To the west and south-west, where the forested areas were neither dense nor continuous, the relatively infertile limestone uplands, and the directions of the Meuse and Moselle, tended to keep the country for long separate from the rest of France. A close connection with Alsace did not begin till industry invaded both slopes of the Vosges, and linked the two together by many bonds. But the existence of a great natural highway, leading *via* Nancy and Toul to Paris, and eastwards by the Col de Saverne to Strasburg, was of great importance in binding the country to France proper. For Lorraine, as for Alsace, but to an even greater degree, civilisation has always lain to the west, and not to the east; the people respond to-day, as always, to the ideals of Paris, and not to those of Berlin. The great modern importance of Lorraine lies in her iron fields; to-day, as heretofore, her position athwart a great highway of invasion is of enormous importance.

Germany annexed Alsace and a part of Lorraine in 1871 partly for strategic reasons, partly in order to cement, in true Prussian fashion, her own unity on what she believed to be the ruins of France: she holds Alsace for its agricultural wealth, for its growing industries, for its potash mines, and for other reasons in addition; she holds Lorraine largely because of its iron mines. That the Germany which the world knows to-day, the Germany of blood and iron, will give up those iron mines, save under the stress of dire defeat, it is almost impossible to believe. That, unless such a defeat were followed by a change of heart, a true conversion, she would not once again begin to plot and plan against the peace of the world, it is almost equally impossible to believe.

The enormous value to Germany of the iron fields of Lorraine forms one of several objections to the well-meant but impracticable suggestion that is favoured in some quarters here, that the disputed territories might be divided between the two countries, France regaining Metz and the French-speaking part of Lorraine, and Germany retaining Alsace and a part of Lorraine. The further fact that the rich iron fields of Briey lie so near the present frontier, and have proved valuable to Germany during her temporary possession of them since the early days of the war, adds another complication.

Her success in seizing French territory in 1871, and the proved value of the territory so seized, certainly played an important part in leading Germany to chance the fortunes of war anew in 1914. So long as the treaty of Frankfort is not annulled, there is always likely to be a party in Germany which considers that war can be made to pay, provided it be done on a sufficiently large scale, and after sufficiently careful preparation.

On the other hand, we must not forget that the industries of Alsace have made great progress under German rule, and that, in all probability,

the iron of Annexed Lorraine has been developed under the same rule to a greater extent than it would have been had it remained French.

If we neglect the moral aspects of the question, which may be said to lie outside the scope of geography, we may say that the original annexations of 1871 *in part*, and the openly expressed desire among certain German groups to extend the annexed areas at the end of the present war, are direct consequences of the industrialisation of Germany. But in this, as in not a few other ways, Germany is but carrying out to a logical conclusion principles of action which seem more or less implicit in the process of industrialisation. Germany was relatively a late comer on the field of industry, and has endeavoured to make up for her late arrival by a quickening of pace, and a cynical disregard of morality. It seems, therefore, not without interest to consider some geographical aspects of the industrial revolution and its effects, for these have a considerable, if indirect, bearing upon the problem of Alsace-Lorraine. This subject we shall discuss in a subsequent article.

SOME ASPECTS OF RUSSIA IN 1917.

With Remarks on a Visit to Archangel, the Northern Dvina, and Vytchegda Rivers.[1]

By E. P. Stebbing.

(*With Illustrations.*)

I propose to tell you to-day something about Russia as I saw it during a part of last summer and autumn. To discuss Russia at the present time is not an easy matter, for there is a great deal which cannot be touched upon, and other questions upon which it is inadvisable to comment. Loose, unwary talk on the subject at the present moment is to be deprecated owing to the great harm, irretrievable harm, which may result.

I do not propose to halt long by the way *en route* to Russia. But I have thought it may be of interest to make a few remarks on the route I took to reach Petrograd. As you know, one method of getting there is *viâ* Archangel. I shall have something to say of this place later on, and of areas beyond it. But I did not proceed by that route. Landing at Bergen, a most beautiful place on a lovely fiord, I went to Christiania by the comparatively new mountain railway *viâ* Fiense. This is a wonderful line, one of the most remarkable in the world, I should say, and I have seen some of the mountain railways in different parts. On leaving Bergen you climb up through mountains clothed with pine, spruce, and birch forest, by a zigzag consisting of fourteen loops, going through innumerable tunnels, the entrances to the more elevated ones being protected by shelters against blocking by snow. It is a fine engineering feat. Finally you arrive at Fiense, the highest point, elevation

[1] An afternoon lecture delivered before the Society in Edinburgh on January 17, 1918.

4010 feet, situated on a flat, dreary, rock-covered plateau, for we are above tree limit, with a lake close by. Fiense is an out-of-the-world, depressing place, snow and ice being the things known best because seen most of. As showing the general outlook of the handful of inhabitants, I was interested to see here an obelisk to the memory of Captain Scott and his companions.

Quite a British colony lived here later on during the exodus of British (especially women and children) from Russia, which was advised by our Government owing to the possibilities of famine. The members of this colony were awaiting a boat to cross the North Sea in, and had not a notion how long they would have to wait. I saw them at the beginning of October, and they were not happy. Christiania and Stockholm are beautiful and interesting places on lovely fiords. From Stockholm in the south to Harparanda in the north of Sweden the chief thing of interest is the interminable forest belt one passes through—pine, spruce, and birch—and the ingenious methods employed of floating out the timber by making full use of the rivers and lakes, these being also utilised for saw-mills, electric power works, and so on. All Sweden is lit with electricity. Harparanda and Tornea, the latter on the Finnish side of the Tornea river at the head of the Gulf of Bothnia, are within twenty miles of the Arctic Circle, towns planted down in the flat, bleak, desolate tundra, as the great, almost treeless, wastes of these northern regions is termed. The towns owe their present notoriety to the fact that Russian news comes *viâ* this inhospitable part of the world.

Finland is a poor duplicate of Sweden, consisting of forest, rivers, and numerous lakes, interspersed with small areas of poor cultivation, rye and barley principally. To a greater degree than in Sweden saw-milling is the chief industry. From Tornea you run almost to the south of Finland, and then turn south-east, and reach Petrograd *viâ* Viborg. It took us six days from Bergen to Petrograd going out, but nearly a fortnight coming back.

Petrograd from the Revolution onwards has been a city of ups and downs, of high hopes which have resulted in disappointment. The Provisional Government, which was set up after the Revolution, had many elements of great promise in it, and some first class men, even if rather inexperienced. A little more stiffening and there appears to have been every probability that they would have brought Russia through, or at least they would have been able to keep the trenches on the Eastern front manned, and thus have prevented the wholesale transference of German and Austrian troops from the east to the west which we are now witnessing. July and August were the fateful months in the Russian situation. This is now evident. There was that brilliant meteoric advance against the enemy brought about by Kerensky's inspiring oratory, the last flash of the Russian army before its light became extinct; for oratory alone cannot win battles. There followed the July rising in Petrograd, three days of shooting, quelled by Cossacks with the loss of an officer and five men only. An impressive funeral was given to these men, in which all the high dignitaries of the Church

and State assisted to mark the general disapproval which had been felt and subsequently openly expressed at the funeral given to the victims of the Revolution, at which no religious ceremony of any kind had been permitted, the bodies being committed to the grave enclosed in red coffins over which waved thousands of red banners. It is said that many of these coffins were filled with bricks instead of bodies, the relations having refused to allow their dead to be buried in this sacrilegious manner.

After the July rising in Petrograd the state of the army at the front rapidly deteriorated, the soldiers said they would not recommence fighting till the spring of 1918, that they meant to retire and recoup and reorganise. Practically the whole organisation of the army was now in the hands of the Soldiers' Committees, composed of privates, N.C.Os., and junior officers elected by the former from the ranks. They decided all regimental matters, and also whether a regiment or brigade, etc., should advance, stand fast, or retire. It was this state of affairs which led to the great Tarnapol retreat. This is perhaps the blackest blot that has ever rested on the Russian army. The front was broken. Thousands of officers in trying to rally their men were shot or bayoneted out of hand by the latter. Many more committed suicide rather than live to witness the disgrace of their regiments, and the most appalling excesses were committed. In the *sauve qui peut* which resulted everything was left behind—guns, shells, stores, food, etc., all stacked *in situ*, as it had been placed for use by this part of the front. The amazing part of this extraordinary flight was the fact that there was no main enemy force within thirty miles of the point where the line was broken. The Austrians and Germans had only to advance and take possession of this enormous mass of booty, which, it was said, afforded two months' supplies for their Eastern Armies. Heroic actions were performed by the soldiery who remained loyal to Russia; officers formed themselves into battalions, and flung their lives away in the effort to fill the gap. The members of the Cross of St. George (that is, all soldiers who had won this decoration), who are organised and who have a central committee, performed superhuman feats, but it was of no avail. Disorganisation was too complete, nowhere probably more so than in the lines behind the front. The soldiers at the back refused to support with new drafts those at the front, and spent their time in demonstrations and meetings.

This total disorganisation of the army had of course spread to the civilian population of the country, especially in the industrial centres. The output of work had fallen to a very low point, and this fall was combined with an enormous increase of wages, paid in the paper rouble, whose value daily decreased. The carrying power of the railways and other transport fell to a very low ebb owing to the impossibility of getting repairs done to the rolling-stock, etc., the workers refusing to do more than three and four hours a day in return for a wage which was as much as five to six times pre-revolutionary rates. In the collieries, oil works, munition shops, and factories the same causes operated, the men spending the greater part of the week holding meetings, at which much

was said about their rights to equal shares in the business, to have equal voices in the management, but little about the equal right of all to do a real day's work. The peasants in the more densely populated parts of the country were in much the same case.

Now it must not be thought that the Provisional Government were not endeavouring, with all their skill and energy, to stem this tide of demoralisation. They were; and there can be little doubt, that had it not been for the Council of Soldiers and Workmen in Petrograd, who to all intents and purposes formed a second government in Petrograd, a government whose energies were concentrated on undoing all that the Provisional Government did, the latter would have come through. As I know from personal observation—and I had facilities afforded me for so observing—much sound, constructive work was performed in July, August and September, with the object of bringing order out of chaos—work which well merited a better ending than has resulted for the moment; though I am one of those who believe that this good work has only been interrupted for a time, by the present phase of Russian politics.

In this belief it is worth considering the causes which led to the present position. They are, I think, three in number. The Provisional Government was weak in its leader. Had Kerensky been a stronger man, a more ruthless man shall we say, he would have dealt with the situation as it existed after the July outbreak in the only possible way to ensure the stability of his Government. In how far the Allies are responsible for the necessary steps not being taken then, I am unable to say, but there is little doubt that the turning point, the cross-roads, were reached at that time, and the right road was not chosen. When Korniloff made his effort in September he was two months too late, or a month too soon. The second point is that the Provisional Government depended too much on oratory and too little on deeds. Every day there was a great deal of talk and the Press was full of it. Decrees and orders were issued daily, and public notice boards and advertisement places throughout the city had new orders and appeals affixed almost daily, but no effort was made to enforce them. For instance, the soldiers were forbidden in future to act as hawkers in the town. The streets were full of soldiers selling all sorts of articles, mostly rifled from the shops. On the day after the order was issued I saw a line of soldiers standing beneath a dozen notices of the new order affixed to a wall, selling laces, matches, newspapers, and safety pins. The third cause lies with the Allied Governments. Were the Governments of the Allies at home fully conscious of the position in Russia, and of the great danger to their cause which that position entailed? There were many in Petrograd, educated Russians and members of the Allies, who were convinced that had the Allied Governments, France and ourselves, given a far stronger support to the Provisional Government—the present position would never have arisen. Is it solely the fault of Russia, in the throes of a great revolution, that she has come to the *impasse* which now confronts her, and that she has as we say "let us in"? It is not a national trait with us to jump on a man who is down. And in the case of Russia we

should be the more careful when history may record the verdict that we are to some extent responsible for her total collapse. Could we not have done more in support of the Provisional Government, more from home I mean! Could we not have done more, broken new ground, not gone on in routine ways, to counteract the German propaganda! Both difficult, very difficult, steps to take, admittedly. But were we not rather too much wrapped up in the Western front, France and ourselves, and did we not let slip a golden opportunity in Russia last summer! My own conviction is that we did. And this brings me to the present. The present state of Russia has to be faced along with the other unpleasant positions on the different fronts, and behind the fronts, in this World War. Are we doing all we can at present in Russia, in the future interest of Russia herself and of Europe, with the object of preventing another war in the future! The German danger in Russia is a very real one. The Allies, both by their action and inaction in Russia in the summer and autumn, due to whatever difficult causes it may have been, have set the bulk of the Russians against them. So far as the British were concerned this was not the case, or wholly the case, last summer, as the many kindnesses and assistance I experienced myself testify. Are we going to let the Germans have the free hand they hope for in Russia! If so it will be a far greater tragedy for unfortunate Russia than any that has yet befallen her.

Petrograd was a curious place to be in last year. The normal life of the city went on much the same as if no war and revolution were bringing the country face to face with anarchy and ruin. The city was crowded, all the hotels could have been filled twice over, and though each outbreak saw a rush of people to the railway stations, where trains went out packed literally to the roof, for the roof of the carriages carried as many as could find a precarious seat or foothold upon them. Yet these people would flock back again when things quietened down. In September, however, an order was issued and put in force forbidding any person to enter Petrograd without a permit. By then the famine prospects had begun to assume a formidable dimension. Even so the Korniloff enterprise threw the machinery entirely out of gear. Returning from Archangel, and expecting to have considerable difficulty in getting into Petrograd in spite of my passes and letters, I walked past the lolling, cigarette-smoking sentries absolutely unquestioned. The pleasure-loving cosmopolitan, who forms the bulk of the Petrograd population, amused itself and carried on in the same old way in spite of the scraps and street firing which were not of uncommon occurrence. Queues were of course the ordinary condition of Petrograd streets—enormous queues of patient people waiting to get their daily wants and often not succeeding. The longest in the Nevski were at the tobacconists and sweet shops; next soap and boots and shoes. These were the day ones. Those at night were food ones. The food question gradually tightened as the summer months drew on into autumn. Many mornings breakfast at the Europe Hotel consisted of a glass of milkless, sugarless tea only, and the other meals grew lighter and lighter whilst the price rose. Dinner cost 12 roubles (a rouble used to be 2s., I paid 1s. for

mine); lunch was *à la carte*—5 roubles a dish, except sweets, consisting of a minute portion of everlasting *compôte* at 3 roubles. The hotel management made no effort to regulate supplies. When there was sugar you were given it in abundance, followed by many sugarless days. The same with tea, coffee, etc. The bread was black—I have never been able to describe its nauseous taste—its consistency like putty, and if you took up a few slices laid together and threw them at the wall they fell with a dull thud on the ground as one piece. There was nothing to drink at meals—water in Russia, unless you know where, how, and when it has been filtered, being a source of typhoid and other diseases. They had a mixture called quass. I tried it once and it took me a week to get rid of the taste. It is rather like rotten fruit mixed with badly smelling fish. It was the traffic disorganisation which was, of course, responsible for the food deficiencies, most of the food being in the south of the country. For this same reason, Petrograd must be now perilously near a total famine.

Another question with which the Government was grappling was the fuel supply for Petrograd during the long winter months. The previous winter the supplies had given out, and great distress and suffering had been the result. With the disorganisation in the coal and oil industries the amounts of these commodities were seriously short, and it was essential to maintain a supply for the railways. Great efforts were, therefore, being made to get large amounts of firewood into the capital. In fact, by September Petrograd began to assume the appearance of a huge wood store. All the squares and open spaces, *e.g.*, the Winter Palace square, St. Isaac's Cathedral, the Champ de Mars, where the revolutionary victims had been buried, the courtyards of private houses, and so on, were filled with great erections of fuel stacks. The quays on the Neva and all the canals were more or less congested with the great fuel barges.

The waterway system of Russia is one of its greatest assets. The great river systems of the country are linked up by canals, and thus give the greatest assistance to the very inadequate railway system the country possesses. In fact, we at home could learn a good deal from Russia in this respect. Petrograd practically depended upon this system of waterways for her winter fuel supplies. It was an open question, however, whether by the beginning of October she had got in enough to carry her through the winter. To outward appearances she had done so, but the amount consumed must be enormous. The wood burnt is birch, and most of it is brought in the barges towed by tugs many hundreds of miles. Unfortunately, last year heavy fellings were made in some of the well-managed forests in the Petrograd district in the interests of this fuel supply, areas which it would never have been necessary to sacrifice had it not been for the dislocation of the transport services.

I made some excursions out into the district round Petrograd during August, and as a result obtained some very interesting impressions of Russian country life at the present moment. The revolution has for the time being entirely upset the peasantry, and it cannot be said to

be their fault. Without education, unable to read or write, they are easily misled. The revolutionary socialistic ideas or catch phrases, shall we call them, of equality for all men and an equal division of all property, including the land; plenty of food for all and no work, naturally spread rapidly amongst the peasantry. To their limited intelligence the millennium had arrived. Undoubtedly German propaganda and German money were largely responsible for the spread of these ideas. It was a common sight to see orators, of the type we have all seen on occasions, holding forth in a frenzied manner to a dull, thick-brained crowd of villagers, who listened with open mouths and expressionless faces. The orator, knowing his audience, confined himself chiefly to repeating his catch phrases of equality for all, the land for the peasants, etc., over and over again. If you remember that this sort of thing went on daily for months, you can appreciate the present condition of the peasantry. Add to this the fact that the peasants were incensed at not being able to obtain their requirements in tea, sugar, iron, and therefore refused to sell their produce, refusing to take the paper rouble in exchange, which they said was of no use to them, and you have the condition of a considerable part of Russia at the present time. The revolutionary propaganda of the arrival of the millennium also resulted in large areas remaining uncultivated the past year. I saw large areas of arable land remaining untilled, the village community having only put under cultivation just enough land to raise the crops they would require for their own consumption this year. Of course the educated classes in Russia could well see the *impasse* into which the nation was drifting, but in the absence of a strong leader they were powerless.

It was during this trip that I saw some fine woods originally grown on derelict, swampy, peaty ground, similar to that of which we have so much in Scotland. I will quote two examples. The first was a fifty-year-old wood of pine, spruce, and birch. The land was originally a boggy peat, and was drained with drains cut a metre deep, the upper layers being fired when dry. The draining cost 8s. per acre. The land was then sown with a mixture of pine and birch seed, which gives better results here than pine seed alone. The spruce came in naturally or was planted in to fill gaps. The other wood was a magnificent piece of old Scots pine in the same neighbourhood, one hundred and fifty years old. The height of the trees was over 100 feet, and diameter 16 inches, with 500 cubic metres to the hectare. It has been valued at about £125 per acre standing. It had been underplanted some years ago with *Abies pectinata*, but they had failed as the shade was too dense.

At the end of August I left Petrograd for Archangel with a companion who knew Russia well, but had not been in the north before. We had some difficulty in getting berths on the train, but eventually arrived at Archangel *viâ* that interesting town Vologda, in which are a large number of churches, some very old and interesting. My object in making this journey was to visit some of the country to the east of Archangel in the governments of Archangel and Vologda. This part of Russia is but sparsely inhabited, and consists mostly of forest, 93 per

cent. of which is owned by Government. It will enable you to realise the hugeness of Russia, the immense spaces comprised in the word, when I tell you that one district alone in the Vologda Government, that of Ust Sysolsk, for which I was bound, is the size of Germany. It lies up a tributary of the Northern Dvina, and I propose to tell you something of this interesting country.

Archangel itself is one of the surprises of the war, in its extraordinary development. With the closing of the usual routes to Russia *viâ* the Continent, and with the necessity facing the Allies of furnishing the gigantic Russian army with guns and equipment, Archangel, the northern port of Russia, which up to the outbreak of war had been a small township of no outstanding importance, and was only ice-free for

Fig. 1.—Kotlas Church at the head of the Northern Dvina.

about five months in the year, was called upon to take on an exceedingly important position. With the help of Britain and France she rose to the occasion, and to those who were acquainted with her in old days she is now scarcely recognisable. At least half, if not more, of the town is new—all wood-built—so are the numerous jetties and quays which project or line the river frontage on both sides. For the town, unfortunately, is on the opposite or north shore to the railway terminus. Some of the largest ice-breakers in the world now keep the port open for nine months in the year. Floating docks of the newest pattern lie off the old docks, and a gigantic crane was towed out from home last summer, and was in full working order at the time of my visit. French and British naval staffs were working in conjunction with the Russians, and enormous amounts of material of all descriptions, including the fine British guns, some of which the Tarnapol retreat presented to the Germans, went up to the front from here. At the time of my

visit one and a half million barrels of herrings from Scotland had arrived, and were being despatched to different centres, whilst an equal amount was on its way. They said here that it was the general opinion that, provided the Russian labourer was kept supplied with plenty of rye bread, herrings, tea, and sugar, he would remain perfectly content, and would quickly get over the revolutionary craze and the millennium habit. The universal cabbage soup he can obtain for himself. In fact it would have paid us, it was held, to have arranged with America immediately after the Revolution to import these things, and to have stopped at once the consignments of ammunition, etc., which continued to arrive, in spite of the certainty that they would not be used.

The population of Archangel is chiefly concerned with two occupations—the sea and commerce of the sea, and saw-milling and the conversion of the produce of the forest. My interest was chiefly concerned with the latter. There are some fifty mills in Archangel, but in the near future they will require to be largely augmented. We know of the great shortage in timber supplies in Western Europe, and we are also aware that after the war the demand for the soft woods, pines and spruces, will be on an enormous scale. A large part of the supplies imported by Western Europe before the war came from Russia, about 50 per cent. of our own supplies coming from that country. Over 48 per cent. of Russia's timber exports went from the Baltic ports, Petrograd, Kronstadt, Riga, Libau and Windau. Some of the material from the two former came from North and North-East Russia: the other Baltic ports were supplied from the forests in the basins of the Western Dvina, Upper and Lower Dneiper and Lithuania. This area will no longer be of great importance in future. For one thing, some 16,000,000 acres are in the fighting zone and have been ruined. For another, the Russians will want to keep the wood of this area to rebuild their devastated buildings in the destroyed regions. The demands of Western Europe will, therefore, be increasingly supplied from the forests of North-East Russia, and Archangel will be the main port of export for these materials. The war prosperity of Archangel is, therefore, unlikely to suffer an eclipse at the peace. Rather will she form one, if not the chief, northern mart of Russia. There are other things besides timber, minerals, etc., in this great forest region which only await capital to develop.

It may be thought that the new Murman Railway, with its ice-free port, will compete with Archangel and the Archangel-Petrograd Railway. In the future it may do so, to some extent, in imports, but not in exports from Russia. There is no connection between these two railways, which are separated by many hundreds of miles of marshy and inhospitable tundra. The Murman Railway runs through the Olonetz Government to the west, and the forests through which it passes will be wanted for railway purposes, or, at the utmost, will afford material for wood pulp purposes. The main part of the great timber areas lie further east on the upper parts of the northern Dvina and its tributaries, and beyond in the Petchora basin, and so on into Western Siberia. To open out this great tract, a railway is projected from

Archangel to the Ob river *viâ* Kotlas, a town I shall allude to shortly.

There is a fine service of river steamers on the Dvina and its tributary the Vytchegda. I left one evening on one of these *en route* to Kotlas, some 400 miles distant. The lower reaches of the northern Dvina, which is about three-quarters to one mile wide at Archangel, are very similar to those of most big rivers. The villages are uninteresting and squalid in appearance, but the mosque-like churches (Fig. 1), which are plentiful, are often beautiful, as are the monasteries. Some sixty miles or so up the river the real forest commences to appear, and from here, except for a belt of cultivation never more than ten miles or so wide on either bank and often narrowing, the great forest stretches away in illimitable

FIG. 2.—Fishing village on the Northern Dvina, with shallops and stages used for net-fishing.

masses right across the country east to the Urals, and from there through Northern Siberia. The vastness of this area has to be seen to be credited, and in order to be able to form some idea of its possibilities when converted to the needs of Western Europe. There are poor areas, stunted growth, marshes and bogs. But there are also enormous areas of fine forest, and nowhere better than in the districts I was able to visit. The main occupations of the people living on the northern Dvina are boat-building on the lower reaches, agriculture, fishing, and forest work, the latter combined with the tillage of the fields in the summer months. As to the forest work, that part of it concerned with the felling of the material, and bringing it out to the river bank, is done in the winter. The riverain villages are also concerned in the summer months with fuel work, loading up the barges with firewood billets. Almost every village, if situated on a bit of cliff above the river, has one or more dry slides down which the billets are shot to the beach

below. In this, and many other ways, I was quickly able to see that the Russian of these parts is a woodman from his cradle. There is little these villagers do not know about felling and handling wood. The river company has its own fuel depots all up the river, and we put in at intervals to replenish our supply. Much of the forest seen on the banks is young, up to fifty years or so, for the old woods of easy access have long disappeared. Here and there a patch on some private estate showed of what magnificent quality they were. I have said that the main rivers are arteries of transport. The Dvina is no exception. We met great barges, towed by tugs, containing produce of all kinds from Central Russia and Siberia, including Siberian cattle for the army. The landing of passengers is usually accomplished at houseboats moored to the bank. Owing to the lowness of the water in September, and the past year was exceptional in this respect due to the very hot season experienced, it is very often impossible to get near the houseboat owing to the intervening sandbanks. In such cases, and at insignificant villages, the boat pushes her nose into the bank, and the passengers are dumped out there with their belongings, having, perhaps, a mile or more to walk to their destination. This brings me to the navigation. With the existing disorganisation elsewhere in Russia one would have thought that the River Company would have had to stop its service of boats. This was not the case. The whole of the rivers are buoyed, and these buoys are lighted at night, the steamers running at night. In spite of the constantly shifting fairway, owing to the drying off of the sandbanks, the buoys were maintained, new ones being placed in position almost daily, and the lighting of them was maintained without a hitch. This lighting was done entirely by the villages of the neighbourhood, the whole of the river being parcelled out amongst them. The lighted oil lamps were fitted into a socket at the top of the buoy every evening before dark, and removed to be cleaned and filled every morning. This work was done by the women and children of the villages. Fogs held us back at times, but not unlighted buoys. Kotlas, where we arrived after two days and three nights, is an unprepossessing town, situated at the head of the northern Dvina, which is here formed from the Little Dvina which comes from the south, and the Vytchegda which has a general easterly direction. The importance of Kotlas lies in the fact that it is the terminus of a line of railway which runs to Viatka, and is thus linked with the Siberian Railway. Coal—our coal—brought up here from Archangel is railed to Viatka, and so into Central Russia. We joined a smaller steamer at Kotlas and went up the beautiful Vytchegda. Of smaller volume than the Dvina, the narrow ribbon of country, probably never more than five miles in width, between the river and the forest, appears to be more carefully cultivated. This may be due to the change in the people. The people on the Vytchegda are known as Zaryanians, speaking a language or dialect which is a compound of Russian and Samoyede. The people themselves are a light-hearted, merry community, very nice to deal with, and first-class woodmen. On the upper reaches they gradually merge into the true Samoyedes, a curious nomadic tribe

which lives on the shores of the White Sea, stretching eastwards under various names into Siberia. Naturally up here the country is sparsely inhabited, and in order to work in the great forests the whole of the commissariat for the men employed has to be taken along with them, for there are no villages beyond the narrow belt. As you get higher up the river towards Ust Sysolsk the forest comes down close to the river, some of it of fine quality, and you get into touch with the real primeval forest of North-East Russia. There the country, up to now more or less level, takes on a rolling appearance, backed by ridge upon ridge stretching away to the foot-hills of the Urals, dimly seen against the horizon some hundred miles or less away, and the whole of this area is covered with pathless forest of pine, spruce, and birch.

FIG. 3.—Samoyede village on the Vytchegda below Ust Sysolsk.

Up here one found provisions more plentiful, in fact the time spent on the Vytchegda was one of plenty so far as food went, although it was still dear compared with peace prices. Most interesting was the aspect of the population; almost would it appear that it remained unaffected, not only by the War, but also by the Revolution. The returning soldiery, deserters for the most part, did not receive much encouragement from the community, and would, it was only too obvious, have to turn to and work once again if they wished to live, for neither relation nor friend would keep them in idleness.

On the Vytchegda the chief occupation of the people is connected with timber, cultivation is obviously limited to a portion only of the family, and to a part of the year only. Most of them are employed, together with their horses, in felling operations in the winter, and in getting the material to the river bank, and part of them in the spring and early summer with floating it down the rivers after the ice has melted,

and in building the rafts, which are subsequently towed down the river by tugs to Archangel, each raft consisting of some 4000 to 5000 logs. This industry, from small beginnings, has during the last few years assumed large proportions, and is destined to become a greater factor still in the lives of the population of the Vytchegda and its tributaries, and of the whole network of rivers of this part. As forest labourers, the people are easy to deal with, and at the time of my visit were already coming in to the timber overseers asking for work, and willing to take a lower scale of wages than the exorbitant rates which had been in force everywhere since the Revolution. That, in my estimation, is the commencement of a saner mind in Russia.

You may think all this very interesting as the experiences of a traveller, but its bearing as regards the war and after the war considerations is not so obvious. The answer is easy. This part of Russia is but imperfectly known to us in this country—in fact, I may say, practically unknown. It is very desirable that it should be better known, that its economic value and possibilities should be now more fully realised by us. For it is a certainty that a considerable portion of the soft wood timber we shall require during the next forty to fifty years must come from this region. And it will be cheaper to get it ourselves than to pay foreign saw-millers for it.

THE PHYSICAL WELFARE OF MOTHERS AND CHILDREN IN SCOTLAND.[1]

(*With Illustrations.*)

THERE will not be many who find it strange that prominence should be given in a Geographical Magazine to a report on the physical welfare of the mothers and children of a given area—in this case, Scotland. For the highest significance of the regional conditions which Geography studies is their influence on the human population, and of the reality of that influence on mothers and children—two arcs of the universal life-curve—there is no doubt. It is indeed characteristic of this masterly Report, for which the author has made the nation his grateful debtor, that the geographical note, sounded in its first sentence, is so often heard through its more than half a hundred chapters. "My official praying-machine is a large map of Scotland. It hangs where I can see it every hour of every day. It reminds me that, within the limits of

[1] Scottish Mothers and Children, being Report on the Physical Welfare of Mothers and Children, Scotland. By W. Leslie Mackenzie, M.A., LL.D., M.D., D.P.H., F.R.C.P.E., F.R.S.E., Medical Member of the Local Government Board for Scotland. The Carnegie United Kingdom Trust, Enst Port, Dunfermline, 1917. Pp. xxviii+632, 2 maps, 6 charts, numerous illustrations.

We are indebted to the Carnegie Trust for the loan of the two blocks used in illustrating this article.—Ed. *S.G.M.*

its outlines, there is nothing indifferent, nothing to be ignored, nothing to be neglected." We wonder how many times a human document of this sort—of far-reaching magnitude and of subtle vital intimacy—has paid due scientific homage to "the map," which is the fundamental datum. "It helps the administrative mind to imagine in closer detail how the 4,760,904 persons that constitute the Scottish people fulfil the various and multitudinous aims of civilisation over the length and breadth of this northern kingdom." The unit-areas of diverse grades—the 33 counties, the 312 public health districts, the 874 civil parishes—like the parts of a very complex, still developing, very far from finished organism, are more or less integrated by the common services of medical, economic, and educational sorts, the united aim of which is to help the members of the communities to make the full use of life. "In our contemplation of the endless flow of the living energies, the map steadies the vision; it gives a groundwork to enable the imagination to watch the play of social forces; it is at once a stimulus to renewed mastery of administrative detail and a guide to the magnitude of local problems."

So the Report begins with two finely executed Bartholomew maps, one showing the contours of the land from sea-level to the mountain-tops, and the other showing the varied distribution of the people, who necessarily spread along the lines of possible livelihood. "The Highlands and Islands include considerably more than half the area of Scotland, but only about one-tenth of the population. The midland valley contains one-fifth of the area, but about three-quarters of the population. Yet, in the Highlands and Islands, as our special reports will show, the problems of motherhood and childhood are as great in their kind as the problems arising out of the concentrations of the midland valley." The massive increases of population in the coal area have not only produced the huge imperfectly integrated growths we call towns and cities, but have activated all the accessible country round about. New and intricate forms of symbiosis are springing up. "We have come to realise that the whole inland area is no longer a remote world where life flows placidly and silently like the growing of trees; it is stirred and drawn by the unsleeping activity of the towns." Twenty-two counties send milk to Glasgow.

The familiar statement that the country populations are flocking to the towns is incomplete; the towns are spreading out to include the country. The process of "urbanisation" which is going on apace, "means that larger areas of the country are, through this or that development of resources, themselves producing towns." This means continued increase in some forms of the pressure of life; this demands fresh organisation, ever striving yet never succeeding in the endeavour to keep pace with growth; and "among the many sections of life needing organisation, the section of motherhood and early childhood is fundamental." The basal problem is to provide a fit home for the mother and her child.

Dr. Leslie Mackenzie distinguishes four general aspects of the problems of motherhood and childhood. *First*, In the rapidly growing

aggregates, over-crowding, over-strain, deficient organisation, and other conditions tend to destroy or deteriorate the life of the child and to make the life of the mother hard. "The mother and child suffer first and most." *Second*, In more slowly evolving industries, organisation is more adequate and smooth-working, but the need for federation of administrative units is still great. "The federation of areas means also a confederation of industries." The widespread occupational antagonism of feeling between burghal and non-burghal populations is gradually being transformed into genuine and conscious co-operation. The interlinking of interests in common endeavour is being followed as ever by the correlated increase of sympathy. "The more it extends, the more easily will the common resources be mobilised to provide better conditions of life for the mothers and children." *Third*, In the areas of crofts and small holdings, the population is split up into little groups which are not equal to the social problems incident to their industry. "The difficulties in the evolution of an adequate service for mothers and children are complicated by yet another factor, namely, the exceptional disproportion between local production of commodities and local demands." Hence the seasonal exodus and other striking features. But the difficulties have their compensation. "The island of Lewis has sent a phenomenal number of men to the services. It lives at all because it keeps touch with a world immensely greater than itself. But it lives on a high level of intellectual and emotional interests. Out of a primitive agriculture primitively conducted, it has sustained its cosmopolitan dream." So for other island communities. "The poverty may be relatively great: but it is never the kind of poverty generated on the margins of the town civilisations. If the islands do not make money, they always grow men—that is their claim to national recognition. They also preserve, with undying intensity, the sentiment of home." *Fourth*, As to the remote rock-islands, like St. Kilda, on the far margin of local government, which the ruthlessly wooden-minded would disinhabit, "it is not easy to speak in sober language, whether we think only of their beauty or of the pathos of their little civilisations." They must be kept within hail.

The next part of the Report is devoted to the existing provisions for the welfare of mothers and children at different times and ages. Effective beginnings of care for expectant mothers, about 120,000 each year in Scotland, are being taken advantage of, but they are only beginnings. "The demands of the near future will compel a great expansion in the provision for prematernity" (p. 52). "Our existing institutional accommodation" (for maternity) "is inadequate" (p. 68). The maternity benefit system, the largest national provision for maternity, has rapidly evolved "a better understanding and appreciation of the nature of public service" (p. 86): "the most striking development is the arrangement for more institutional accommodation and treatment, indoor and outdoor" (p. 85); "in the face of immense difficulties the system has grown into a beneficent and far-reaching social service" (p. 89), and some suggestions for future organisation are offered. Provision for mother and child under the Poor Law, provision for the

unmarried mother, and provision for the unmarried mother's child, are then discussed with all the balance of a scientifically trained mind. We see the same quality in the consideration of the question:—"What effect has the physical employment of the expectant and nursing mother on the vitality and health of her child?" "To this question none but provisional answers can be offered." Not that the author has not much to say, but he will not be hurried, he must be sure of his facts, and these are still insufficient for general conclusions. "But they are enough to show that the problem of the relation between the industrial worker and her children is an indirect problem of trade organisation; that the results to mother and child are frequently of the worst kind, and that any serious effort for the conservation of the family means a drastic revision of the whole conditions of labour" (p. 153). In regard to the whole problem of the feeding of mothers and children, involving such questions as the nutritive consequences of boiling milk, there is urgent need for prolonged investigation. Another aspect of the great biological problem of the influence of the environment upon the organism is dealt with in the strong chapter on housing. After allowing for complicating factors, we cannot escape "the substantial truth that the lives of women and children necessarily suffer deterioration from life in one room." "The Scottish nation cannot any longer afford to keep up so many one-room houses; they mean too great a waste of the nation's real wealth—the mothers and their children" (p. 183).

Turning to the existing provisions for the protection of infant life, Dr. Leslie Mackenzie shows that they suffer from the multiplicity of the administrative authorities responsible. "There is room for a re-investigation of the whole machinery for dealing with children from the standpoints of health, education, and crime. It is not so much a question of legal powers as of administrative correlation" (p. 207). The next chapter deals with "the maternity and child welfare travelling exhibition"—a happy idea crowned with success, which deserves continuance and extension. The difficult problems of the birth-rate were held to lie outside the author's remit, but in the short discussion of the subject he lays emphasis on the disquieting fact that "the infants tend to be most numerous just where the conditions they are born into are worst" (p. 221).

We must pass over a hundred pages or so dealing with the existing provisions for the welfare of young children—ex-babies as well as babies—and with feasible lines of further development; but we are bound to direct attention to the exposure (p. 256) of the fallacy of using the abstract figures of a reduced infantile death-rate as a reason for doing nothing. The biological commonplace is made vivid that we are as much interested in the health-rate. "Absolutely the poorest praise that can be bestowed on any institution is that it just keeps its children from dying." "The disease-rates are a better index to problems than the death-rates."

We have spoken of the author's shrewd appreciation of the geographical basis, and all through the book we feel that we have to do not only with a medical expert and an administrator, but with a bio-

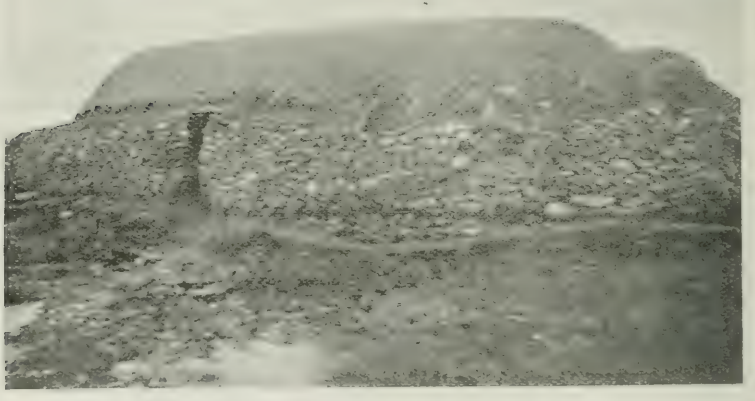
logist, at once by instinct and by discipline. This comes out strongly, for instance, in the discussion of the day-care of children. Thus he writes: "It is not fully recognised that all children require opportunities for action. As they emerge into the walking stage, the opportunities for action become imperative. The still nursery is then an anachronism. The real need is a constantly varied field of activity" (p. 334). This leads to the story of toddlers' playgrounds (with a charming appreciation of the toddler himself), and to a fine discussion of the developmental value of play-centres. In this connection we should have been inclined to pay tribute to Dr. Karl Groos, who was the first, we think, to demonstrate with satisfactory thoroughness the biological significance and indispensable value of play. The practical point of these interesting chapters, to which Mrs. Leslie Mackenzie has made important contributions, is that "ideas long familiar to students of human growth may now be supported and developed by the ordinary civic administrations. Education is the fine flower of all our efforts. But the education must be supple and fresh. It must wait on Nature, and do honour to the originalities of instinct. Education is the superintendence of growth" (p. 357).

It is a happy indication of social good-will, as well as an enviable compliment to Dr. Leslie Mackenzie as a man, that so many different people, both officials and amateurs, should have had the pleasure of offering some contribution—large or small—to the *magnum opus*; and nowhere is the value of this more obvious than in the very interesting section on regional surveys. These have a strong geographical interest, for they give concrete presentation of the intimate life of typical regions. The happy idea of working out representative or contrast studies arose from a chance remark of Mr. A. L. Hetherington, secretary of the Carnegie United Kingdom Trust, who reminded Dr. Mackenzie of a distinguished administrator's wish "to go to a locality and stay in it until he found out why the children died, and how they could be kept from dying." The author has extended his own endeavours towards this ideal by enlisting the help of experts, who have given us illuminating, if often saddening, pictures of characteristic areas—a mainland district in the Highlands, the Outer Hebrides, East Coast fishing villages, two Shetland islands, a Skye parish, a Highland mainland parish, a south-eastern agricultural area, a group of industrial villages, a small county in the midland valley, a large Highland county, and some mining districts. There is also a special study of the Caithness tinkers. These vivid applications of *Le Play* methods appear to us invaluable.

Some of the general results are very interesting. Thus all the contributors are agreed that, in the Highlands and Islands generally, as well as in the fishing villages, venereal diseases are conspicuous by their rarity. "This is a very important fact biologically as well as medically. It practically eliminates from consideration one or two known causes of congenital disease and disablement. . . . Such manifest degenerations among individuals as may be discovered in circumscribed communities may thus with greater safety be assigned to other causes" (p. 394). Another remarkable result is that the problems of mothers and children

in the more remote and thinly populated areas are essentially the same in kind as in the thickly crowded areas. "The difference in degree is counterbalanced by the difficulties of attendance, the distance from doctors, the defective housing and the absence of convenient institutions." We should like to refer in a word to the glimpses that we get in passing of the quite extraordinary devotion and heroism exhibited in outlying areas by medical men and nurses.

Very instructive is Dr. Mackenzie's interpretation of the "Black Houses" of Lewis, which the stranger so hastily dismisses as the outcome of laziness or perversity. The "black house" is "a product of long labour and sacrifice; it is part of the price that a people of immense ability and high character have to pay for their civilisation." It is "a fundamental part of the only system of agriculture formerly found possible in this island of gneiss rock, clay, and peat moss" (p. 427).



Typical Black House in the Hebrides, without chimney or window.

"The peat smoke in the house without chimneys is tolerated and encouraged day and night through all the winter that the straw on the roof may be saturated with the distilled products of the peat, and thereby converted into a specific manure for the soil" (p. 427). Similarly the "cattle housing" where the cows live practically with the people, may be deplorable and disastrous, but the point is that it has a perfectly intelligible purpose. "Fodder is very scarce; so the animals must be kept in a warm house to save expense. If they are so weak at the spring 'lifting' that they need to be helped into the open, they gather force again on the moors, where the children live with them at the sheilings for all the summer."

The Report is framed on large lines, and deals with its problems in a many-sided way, so that our account of it may be almost fallacious in its meagreness. But we hope that our sampling will lead many to the document itself. It completes its survey with an account of the

suggestions towards amelioration that have been or are being put forward by various authorities. These are grouped under the three heads of —Education, Research, and Institutions. Educational suggestions include travelling exhibitions, local exhibitions, rural institutes, instruction in all the great issues of housing, training of health-visitors, pooling and diffusion of reports. In great part the people still perish for lack of knowledge. We venture to suggest that a skilful digest of Dr. Leslie Mackenzie's own Report—if it could be made without leaving the life out—would be of incalculable value if put into widespread circulation. As to research, there is urgent need for further inquiry into special questions, such as stillbirths, infantile senescence, malnutrition, monstrosities, prenatal death, the effects of syphilis and of many obscure infections, the functions of the special glands as factors in growth. The whole group of problems, centering in the unmarried mother and her child,

One of the older houses in Benbecula.

need more exhaustive sociological inquiry. Other problems arise in regard to teething, rickets, milk, dietary, and the endowment of motherhood. Institutions are needed for the scientific investigation of malnutrition; the accommodation for maternity is inadequate; much provision is required for the still incipient day-care of children under five, though, in this regard, due care should be taken to preserve to the fullest extent "the spontaneity, the originality, and the enthusiasm that mark the modern movement towards the better day-care of young children" (p. 617). The problems demand analysis, thinking, constructive form. "They involve study, research, teaching and administration. In variety, they range from the advising of the expectant mother to the methods of constructing habitable cities; in difficulty they cover social questions that no civilisation has anywhere entirely answered; in urgency they rank among the first social issues of our time" (618).

The Carnegie Trust is to be congratulated on having secured this valuable Report, and on having issued it in a dignified, beautifully printed form. They have crowned their wisdom by offering on generous lines to provide in Scotland as well as in England a National Institute of Maternal and Child Welfare. This is obviously a contribution of first-class importance towards the correlation of social and scientific energies.

We have spoken of the geographical note and the biological note, so characteristic of this Report, but the human note is strongest of all. Behind the man of science and the administrator is the man of feeling, full of sympathy and gentleness which have added to his insight.

One final remark we must be allowed, and that in regard to style. For the Report is actually literature. It is not merely that to clearness of sentences, there is often added a distinct melody; it is not merely that attention is held by telling phrases; it is that through and through we are shown open vistas. For the author's literary form often suggests his mood, that there is a subtlety and a sanctity about the hard facts of life which we are apt to miss: that nothing is finished and finally cleared up, but everything in evolution, and still requiring analysis. We are irresistibly reminded of a good landscape painting, with its suggestion of mountains beyond mountains, and of glens that beckon us to unseen mysteries. Therefore, for many more reasons than one, we would thank Dr. Leslie Mackenzie for his masterly and wise contribution towards a worthier control of life.

J. Arthur Thomson.

GEOGRAPHICAL NOTES.

Europe.

Origin of the Auld Wives' Lifts.—In connection with Professor J. W. Gregory's paper on this subject (vol. xxxii. p. 279), we note that Mr. James Neilson opposes the view there set forth that the stones constitute a pseudo-megalithic tor. Mr. Neilson read a paper to the Geological Society of Glasgow in December 1916, which was issued as a separate in December 1917. A copy of this separate has been sent to us. In it the author sets forward his reasons for disagreeing with Professor Gregory's interpretation, and in support of his own view that the stones were brought into their present position by human agency, and thus must be regarded as forming a cromlech.

Polar.

Captain Amundsen's Expedition.—It is stated in the *Times* that Captain Roald Amundsen proposes to leave Norway this summer in his new Arctic vessel, the *Maud*, which has been specially built for this attempt to reach the North Pole. The vessel is to be provisioned and fitted out for a seven years' stay in the ice, but Captain Amundsen hopes to be back within four years.

The Crocker Land Expedition.—Mr. Donald B. MacMillan, the leader of this expedition, gave a lecture on the work of the expedition before the American Geographical Society in November last. According to the very short report given in the December issue of the organ of the Society, *The Geographical Review*, the lecturer described especially the re-survey of Ellesmere Land, and reported the discovery of several large glaciers. One of the major streams by which the ice-cap discharges into the sea has been named the American Geographical Society Glacier. The lecture was illustrated by excellent lantern slides and some fine cinematograph films. The latter are stated to have included a remarkable film showing the *Neptune*, the third relief ship of the expedition, pushing its way through the heavy ice of 1917.

General.

The British Association.—It is announced that the annual meeting of the British Association, which it was proposed to hold this year in Cardiff, has been cancelled. Thus, for the second year in succession, the hitherto continuous series of meetings will be interrupted. The decision has been taken on the advice of the Local Committee, which found it impossible to make satisfactory arrangements owing to war conditions. Sir Arthur Evans is to remain president for another year, and there will be a statutory meeting in London on July 5 to receive reports of committees and to transact other business.

Commercial Geography.

The Arctic Seal Fishery and the War.—In the recently issued number of *La Géographie* (Nos. 6-8, 1916-17), M. Charles Rabot discusses one of the minor destructive effects of the war which has been the result of the ardour with which the hunting of seals and other Arctic animals is being carried on. This zeal was primarily due to the rise in price of animal oils and skins, but in Norway, where the food shortage has been severely felt, the flesh of seals has appeared in the town markets as an article of food. In 1916 no less than 173 ships put out from the ports of Northern Norway for the purpose of seal-hunting. Their total catch included 48,415 Greenland seals, 15,878 other seals, 136 walrus, 204 polar bears, 31 bottle-nose whales, 3 narwhals, 1 white whale. The catch was valued in the Norwegian Custom House at £236,000, about eight times the usual value of the ordinary Arctic fishery. But the estimate did not allow for the enormous rise in value of seal oil, and it is probable that something like twice this sum was realised, while the value of the seal meat obtained must have been about another £80,000. In 1917 the winter seal fishery which is carried on off the Varanger Peninsula was also very profitable, several thousand seals being obtained in the last fortnight of March. Owing to the German blockade of the Arctic Ocean E. of long. 24°, and up to lat. 75° N., the seal fishing in the Barents Sea was less active last summer.

Seal fisheries are also being pursued with great vigour off the

island of Newfoundland, where huge profits have been obtained. In 1915, during the brief hunting season of five weeks, twenty ships obtained 272,965 seals. In three weeks, in 1916, eleven ships obtained 241,000 of the animals. In 1917, owing to the rising price of seal oil, the catch was even more profitable than in 1915. The meat in this case does not appear to be utilised, though there seems no reason why it should not be.

EDUCATIONAL.

New Professorship in Geography and Anthropology.—We are informed that at a recent meeting of the Council of the University College of Wales, Aberystwyth, it was reported that an anonymous donor was prepared to transfer the sum of £10,500 to the College for the purpose of endowing a Chair in Geography and Anthropology. The lectureship in the College has for many years been held by Dr. Herbert John Fleure, who has been extremely active in pushing the claims of Geography both in the College and in the secondary schools of Wales. Dr. Fleure was appointed Professor of Zoology at the College ten years ago, and he will now devote all his energies to the department of Geography.

NEW BOOKS.

ASIA.

Dans l'Incendie Tropical. Par Marcel Genlis. Paris: Plon Nourrit et Cie. Printed in 1914. First published in 1917. Second Edition. *Price* 3 *francs* 50 *c.*

After a lively description of calls at Colombo and Singapore, "while the steamer was coaling," the author reached Saigon and Cheling, proceeding to Mytho on the Mekong, one of the finest rivers in the world. At Pnom Penh he found the Cambodian, different from and stronger than the Annamite race. The marvellous temple of Angkor Vat and its adjacent town of Angkor Thom are carefully described. Returning to Singapore, he crossed to Batavia, and considered the scenery of Java superior to that of Ceylon. "Nothing," he declares, "could compete with Javanese scenery, with its panoramas bounded by gigantic volcanic cones crowned with virgin forests, while ricefields cover their flanks in terraces like the lakes around a magnificent castle."

Then, after a tour through Burma, the author reached India, and gives bright little sketches of the various towns he visited. Like all Frenchmen, he was particular about his food, and summarily condemns what he got at Indian hotels. "La cuisine anglaise, mettons Indo-anglaise pour ne froisser personne, est exécrable. Et d'abord elle est invariable : à chaque repas ils vous servent tout ce qu'ils savent faire, comprenez des viandes rôties mais pas cuites, et des légumes à l'eau sans beurre ni sel." However, he was delighted with "le riz au curry, plat purement hindou," adding, "C'est de riz au curry que j'ai vécu aux Indes."

AMERICA.

Central America: Guatemala, Nicaragua, Costa Rica, Honduras, Panama, and Salvador. By W. H. Koebel, author of *Paraguay*, etc. London: T. Fisher Unwin, Ltd., 1917. *Price* 10*s.* 6*d. net.*

To Mr. Fisher Unwin's South American Series has been added *Central America* by Mr. W. H. Koebel. The book is as handsomely produced and illustrated as its predecessors, and it bears evidence of personal knowledge on the part of the author, as well as of careful study of statistics and consular reports. The first ten chapters are historical, and necessarily treat of the region as a whole. The most interesting portions are those dealing with the chequered career and treacherous execution of Vasco Nuñez de Balboa, the discoverer of the Pacific Ocean; the tragic story of the Darien Expedition, doomed from the first to failure, mainly through English hostility, and one of the immediate causes of the Union in 1707; the period of the Buccaneers, gentlemanly and otherwise, and the tale of the Indians of the Mosquito Coast. These natives were under British protection until 1860, and, though now included in Nicaragua, their descendants would willingly return to their old allegiance, and still speak English in addition to their own tongue. Chapters XI. and XII. deal with political and geographical aspects, and with communications and industries. A considerable amount of stress is laid upon the banana industry of the Atlantic coast, the establishment of a regular line of steamers based upon New Orleans, and the building of lines of railway from the plantations to the ports. The references to volcanoes and earthquakes are specially interesting in view of the recent disaster at Guatemala. Both coastal plains are unhealthy, so the population tends to concentrate on the interior plateau. It is this region, however, which is subject to earthquakes, and where alone the volcanoes exist. Guatemala city has been twice rebuilt on different sites, and now once more it is faced with the problem of reconstruction. Central America is a high and narrow plateau, situated between two deep seas, and it is thereby in a highly unstable condition. It is to be feared that many centuries must elapse before equilibrium is reached. The next six chapters treat successively of the different states in some detail. The information is grouped under various headings, such as area and population, products, manners, and customs; lists of exports and imports are given, with in most cases the principal countries of destination and origin. In fact we have all that is required of a commercial handbook. The chapter on Panama contains an interesting, if not very exhaustive, account of the Canal. The tribute to the modern methods of sanitation which have changed the death-trap into a health-resort—surely a somewhat extravagant expression—suggests that similar methods might be applied to the deadly coast-belts farther north. The author takes a reassuring view of the landslide area, and states that the slides are neither so extensive nor are the prospects so disastrous as has been supposed. Chapter XIX. gives some natural history notes, but, owing probably to necessary compression, it is the least interesting in the book. The last two chapters deal with British interests in Central America. We have the usual preliminary statement, to which we are now becoming drearily accustomed in books on any part of the world, about the backwardness of British merchants compared with those of other countries, such as the United States and Germany. The author even goes a step further than is usual when he says (p. 293): "The fact is that during the past quarter of a century the British industrial world has been in a frame of mind which in a competitive era is sheerly suicidal. It has been satisfied with what it had." He then proceeds to give figures which in every case but one place the United States first and Great Britain second, and

which also show that British trade is increasing. In the chapter on Nicaragua we are informed that British interests are largely confined to the Pacific coast, and in the list of statistics at the end of the same chapter he puts Germany second every time, although British imports from Nicaragua are in almost every case many times larger than Germany's. If Mr. Koebel thinks it is desirable and possible for Britain to do all the export and import trade of the *whole* world we cannot argue with him, but surely he does not mean *that*. If he thinks that Britain's share should be greater, then we think it is time for him and other writers on similar subjects to change their methods. The scolding method should be left to that section of the cheap press which makes its living by it. Nothing comes of it except the profit—we hope temporary and fleeting—of those who practise it. It is not meant to do good. We are willing to believe that Mr. Koebel is not actuated by such base motives. We are an imitative and somewhat thoughtless people, and, probably, he has without much or any consideration adopted the ways of many of his predecessors. But to do the author justice, after he has delivered his parrot cry, he points out several ways of promoting British trade and interests. Amongst them the study of Spanish would seem the most important. A knowledge of Spanish would lead the commercial traveller to learn the needs and wants of his customers better, and to press these upon his employers. The volume ends with historical and commercial appendices. The index is rather inadequate, but it is to some extent supplemented by full headings to the chapters. The map at the end does not always contain the railways marked as indicated throughout the text. One or two slight slips may be noted. On page 217, "Pacific" should be "Atlantic." On page 273 there are said to be eight towns in Nicaragua with more than 10,000 inhabitants, while on page 274 a list of nine such towns is given. On the same page San Miguel, "only just exceeding 7000 feet," is said to be the highest volcano. On page 275, San Salvador is said to be "some 8000 feet in height." But we have no hesitation in recommending this book to all interested in Central America.

GENERAL.

Okeanographia. By Jules de Schokalsky, Professor Emeritus in the Russian Naval Academy. Petrograd, 1917. *Price* 16 *roubles.* (In Russian.)

This elaborate and comprehensive book has a double interest, scientific and human. Though the actual writing, and the preparation of the fine series of maps and diagrams, must obviously have been the work of a prolonged period, publication took place during the eventful year of 1917. Thus the final stages of preparation and the whole process of publication must have been going on during a time when, as it seemed to the western world, only chaos reigned in the vast empire of Russia. We seem justified, therefore, in hailing the volume as a proof that even in the Russia of the later stages of the revolution work of a highly specialised and technical nature could still be carried on, and that, while the world must have seemed to the people of Petrograd to be rocking, there were still those convinced that all was not over with civilisation and with science, and able to act upon this principle. In welcoming Professor Schokalsky's great work, therefore, we may send a greeting to the silent Russia which is our hope for the future in these dark days. We say Professor, for we presume that the word General, the more familiar prefix of one of our most distinguished Corresponding Members, has ceased to exist in the New Russia! Our readers may remember that Professor Schokalsky is President of the Russian Geographical Society, and in the earlier

part of the war was still preparing hopefully for a future International Geographical Congress in Petrograd.

As regards the contents of the volume, its special feature is the large amount of space given to the subject of the movements of sea-water, which is considered in all its bearings. Owing to the fact that the author is a naval officer, a considerable part of whose official life has been spent in hydrographical research, he has been able to treat the subject from a fresh and original standpoint. He has also been able to present a number of facts new to science, more especially as regards tides in Russian waters. As a result the discussion of the movements of the sea occupies more than half the book. In addition it contains a short history of oceanographical exploration, a series of chapters on the distribution of land and water, sea-level and its meaning, the depth of the ocean and of the seas, deep-sea deposits, salinity, temperature, the colour of sea-water, the propagation of sound in sea-water, and so forth. Of these, questions connected with salinity and temperature are treated with some fulness. There is a good bibliography, and two indices are added.

A very special feature is the large number of maps, graphs and diagrams, some of the maps being of great interest. We note, for example, two valuable charts in the account of the development of oceanographical science. One of these shows the tracks of the oceanographical expeditions of all nations, and brings out admirably both the areas which have been studied with some fulness, and those in regard to which information is still scanty. The same lesson is brought home with even greater clearness by a map of the world in hemispheres, on which is shown both the extent to which the land-surfaces of the globe have been mapped, three shadings being used to indicate different degrees of detail, and the extent to which the oceans have been sounded, two symbols being used in this case to indicate the relative number of actual soundings in the areas surveyed. Among the diagrams, also, we may note especially one showing the distribution of temperature at all depths along a line drawn from the Antarctic Continent to South America.

It is to be feared that the number of persons in this country who combine an interest in oceanography and a sufficiently detailed knowledge of the Russian language to enable them to follow the book in detail must necessarily be very small, and, under present conditions, an early translation into English or any other western language can scarcely be hoped for. It would, on the other hand, be a comparatively simple matter to publish the more interesting of the maps, graphs and diagrams, with English lettering, so that they would be available to a wider circle than at present, and we may express the hope that some of them may appear at an early date, under some form or other, with this addition. Meanwhile we can only offer to the author our congratulations on the appearance of his book, and express our appreciation of the patience and labour which its preparation must have meant under most unfavourable conditions.

EDUCATIONAL.

Around the World with the Children. By Frank G. Carpenter, Litt.D. New York: American Book Company. 1917.

This book is an introduction to the study of Geography, and fortunate indeed are the little folks who begin their studies in such an interesting and attractive fashion. It describes an imaginary journey round the world, in which the little travellers are introduced to their brothers and sisters of other lands. They become acquainted with the climate, productions, and life of other countries, and at the

same time, under the guidance of their teacher, and by constant reference to a globe, acquire a knowledge of geographic terms and of the world's chief physical features that prepares them for the future study of Geography as a science. The suggestions to the teacher are of special value. The book is written in a simple and attractive style, while the illustrations are certain to make it popular with those for whom it is intended. The whole get-up of the book is admirable, and what we have learned to expect from the publishers. As a school book or as a reward book nothing better could be put into the hands of children.

BOOKS RECEIVED.

A War-Time Voyage: Being the Itinerary of an Ocean-Tramp from Port to Port, 1916-17. By J. E. Patterson. Crown 8vo. Pp. xiv + 266. London: J. M. Dent and Sons, Ltd., 1918. *Price* 6*s. net.*

The War and the Bagdad Railway: The Story of Asia Minor and its Relation to the Present Conflict. By Morris Jastrow, Jr., Ph.D., LL.D. With 14 Illustrations and a Map. Crown 8vo. Pp. 160. Philadelphia and London: J. B. Lippincott Company, 1917. *Price* 6*s. net.*

A Geography of the British Empire. By A. J. Herbertson, M.A., and R. L. Thompson, B.A. With 113 Diagrams and 16 Plates. Third Edition. Revised by O. J. R. Howarth, M.A. Crown 8vo. Pp. 256. Oxford: At the Clarendon Press, 1918. *Price* 2*s.* 6*d. net.*

Who's Who? 1918. London: A. and C. Black, Ltd. *Price* 21*s. net.*

Whitaker's Almanack, 1918. London: Joseph Whitaker. *Price* 3*s.* 6*d. net.*

The Structure and Later Geological History of New Zealand. By C. A. Cotton, D.Sc., F.G.S. Extracted from the *Geological Magazine*: Decade vi. Vol. iii. Pp. 243-9 and 314-20, June-July, 1916.

Block Mountains in New Zealand. By C. A. Cotton, D.Sc., F.G.S. Reprinted from the *American Journal of Science*, vol. xliv., Oct. 1917.

Presented by the Author.

Necrologia Ilustrisimo Senor D. Eduardo Mier y Miura, Socio Corresponsal de la Real Sociedad Geografica. Discurso leido por Rafael Álvarez Sereix. Madrid, 1918.

The Auld Wives' Lifts. By James Neilson. Reprinted from *The Transactions of the Geological Society of Glasgow*, vol. xvi., Part ii., 1916-17.

Report of the Boundary Commission (Scotland). Representation of the People Bill, 1917: Redistribution of Seats. London: Published by His Majesty's Stationery Office, 1917. *Price* 8*s. net.*

The Guide to South and East Africa. London: Sampson Low, Marston and Co., Ltd., 1918.

Sudan Almanac, 1918. London. *Price* 1*s. net.*

Colonial Reports (Annual).—Somaliland (944); Swaziland (945); Nigeria (946); Basutoland (947); Gold Coast (948); Ashanti (949); Bechuanaland Protectorate (950).

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THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE SETTLEMENT OF THE PACIFIC.[1]

By the Right Honourable Sir William Macgregor, P.C., G.C.M.G., C.B., F.R.S.G.S., Etc.

The Ocean.

The Settlement of the Pacific is the subject that I have the honour to put before you this afternoon. It may well be the case that much of what I have to say to you would, a few years ago, have been considered as outside of the domain of Geography; but in the hands of teachers like Mr. Chisholm, and of men of the new Oxford School, the realm of geography has been so extended that one feels that one can hardly stray beyond it, even in dealing with the many questions that concern the vast expanse of the Pacific at the present time.

It has been said that Balboa, when he first saw this ocean, on the 25th September 1513, thought of it as the "South Sea," in contradistinction to the "North Sea"; that Magellan in recognition of a fine weather passage across it from the coast of Chile to the Ladrone Islands, in the first quarter of 1521, deemed it worthy to be called "Pacific." According, however, to Sir Clements Markham the name of Pacific originated with the young son of the chief of Comogre, who told Balboa of its existence, and added that it was always smooth and never rough like the Caribbean Sea. The epithet of "Great Ocean" given to it by Maltebrun is falling into disuse. Hardly any two authorities give the same figure for its area, but if we take the estimates of Dr. Bruce, which have evidently been prepared with the greatest care, it becomes clear that the Pacific covers more than a third part of our globe, and that if the land surface were laid on it, it would be an island; and if Mount Everest were removed and sunk

[1] An afternoon lecture delivered before the Society in Edinburgh on March 7, 1918.

in the "Planet Deep," its summit would be 3000 feet below the surface of the sea. The Pacific is thus our great reservoir, containing more than half of our water supply, and exercising much influence on climate and the conditions of life, even on this side of the globe.

It is of interest to Edinburgh to recall the fact that, from 1895 to 1899, the greatest ocean depth then known was the "Penguin Deep," discovered by Captain Balfour, of 30,928 feet, not many miles south-east of the Kermadec Islands. In 1899 the American ship *Nero* found the "Nero Deep," of 31,614 feet.

In 1912 the German ship *Planet* discovered, not far from Mindanao, one of the Philippines, the "Planet Deep," which, with a depth of 32,113 feet, still holds the "record." The tropical part of the Western Pacific enjoys the most equable temperature on the globe. That is due to the physical fact that it is one of the inherent peculiarities of water—certainly one of the most wonderful of all created things—that it takes a comparatively great amount of heat to raise it a degree of temperature, and that consequently it takes a long time to cool; and at the same time as the greatest "deeps" are in the Western Pacific the accumulation of water there is enormous, so that from these causes, and because of its latitude, the mean temperature of the water over a large area is as high as 82° F. and more; and from 25° north to 25° south coral organisms are very active. The *Planet* found that the island of Ponape (in the Eastern Carolines) rests on a base of solid coral rock, extending down to a depth of 6900 feet. This high and equable temperature has naturally a great effect on vegetation, and accounts for the extraordinary fertility of many of the islands.

If we accept as facts that the Phœnicians circumnavigated Africa; that the Norsemen and Normans visited Newfoundland and North America long before Columbus and Cabot were born, it cannot but seem strange to us, with our rapid means of locomotion, that the Pacific remained unknown to Europeans till four centuries ago.

It is hardly possible to speak of the history of the Pacific without reference to the celebrated line of demarcation laid down by the Borgian Pope, His Holiness Alexander VI. It will be remembered that it was drawn from pole to pole about 35° west of Greenwich, at about where Columbus found no variation of the compass. Alexander was only doing in this matter what had often been done in other cases by his predecessors. But he was such a thorough man of the world that he must have known quite well that when he directed Portugal to occupy all new discoveries east of that line, and Spain to hold all that she found west of it, this partition would greatly stimulate their energies. The treaty of Tordesillas in 1494, a year after the Pope's decision, between John II. of Portugal and King Ferdinand of Castile, shifted the dividing line to about 46° 30′ west, which, being extended into a great circle, gave Spain the Pacific up to a line that would have divided the Pelew Group, passing through Australia, New Guinea, Japan, and Manchuria, but leaving the Spice Islands and the Philippines well inside the award to Portugal. But this was, of course, unknown then. Magellan had assured the Spaniards that the Spice Islands were so far east that they

should belong to Spain, and he offered, under a commission from Charles V., to proceed to occupy them for that country—contrary to the interests of his own native land. He reached the Ladrone Islands, which *did* belong to Spain, 5th March 1521, and ten days later arrived at the Philippines, where he converted the ruler of Zebu to Christianity, and lost his life in trying to exact tribute from the Chief of Metan. In this, however, he may have been acting in good faith, for his longitude was all wrong, and was not corrected till this was done by Dampier. The effect of Alexander's decision has lasted into our own day, and we have seen one of his successors confirm his decision as regards the Caroline Islands. The treaty of Tordesillas thus left the Pacific as a Spanish lake, but it was then very far away, and left ample ground for dispute and for wrongdoing on the part of the stronger power against the weaker one. Thus Spain made Portugal pay 350,000 ducats for her own property in the Moluccas; and she officially annexed the Philippines, which were clearly on the Portuguese side of the boundary. Apparently neither nation was scrupulous, and colonial officers in those days appear to have had a good time, for St. Francis Xavier wrote home that no officer in India could hope to save his soul. Now, of all that fertile and wealthy corner of the Pacific, Spain retains nothing save bitter memories; and Portugal only some very much neglected 6000 square miles at the north end of the Island of Timor. The Dutch very soon made their appearance in the Malay Islands, and there are few more striking contrasts than that between the prudent management, both economically and politically, of Holland and the short-sighted and inefficient colonial mismanagement of Spain and Portugal in that part of the world, where for three hundred years the Dutch have retained their position, and governed so well that, in some directions at least, we have imitated them.

German Possessions in the Pacific.

These form the subject that interest us most at the present time in connection with the Pacific. According to *Kurschner's Jahrbuch* of 1916 they consisted of:—

	Square Miles.	Population.
Kaiser-Wilhelmsland, . . .	70,135	110,000
Bismarck Archipelago and Solomons, .	22,046	210,000
Caroline Islands, ...	598	40,900
Mariana Islands, ...	241	1,118
Marshall Islands, ...	156	17,500
German Samoa, ...	993	37,000

The total area is thus 94,169 square miles, and the population 416,618.

The white population was only 1971, and of these 1334 were Germans, or about 1 to every 71 square miles.

These German colonies are thus shown to have been so far of no value as homes for an overflow of population from the German Empire,

but they are of much importance commercially, and of great strategic value for aggressive purposes.

The Hamburg trading house of Goddefroy began operations in the Pacific in the early sixties, and, having established itself in Samoa in 1858, developed such activity and enterprise that it soon completely overshadowed all other traders in that ocean. Its agents, and its very competent collectors, were everywhere, till its trading stations and agencies numbered some five and forty. It had, however, overgrown its strength, and fell into financial difficulties in 1879. The firm had by that time made a very considerable number of Germans well acquainted with a large part of the Western Pacific, and "had brought whole groups of islands under their influence," and had sent magnificent ethnological collections to the Fatherland, where the firm had many friends. Meanwhile, a desire for colonial possessions had been gradually growing up in Germany, and in 1871 a proposal was made that France should cede some of her colonies as part of the war indemnity, but this was not approved by Prince Bismarck. A German Colonial Society was formed in 1881, after the Reichstag by the narrow majority of sixteen had refused to guarantee 3 per cent. on the Goddefroy estate, which had its principal station at Apia in Samoa. The action of the colonial society and of the German Trade and Plantation Company of the South Sea Islands at Hamburg was for the time paralysed by Queensland hoisting the British flag on Eastern New Guinea, 4th April 1883. The disallowance of this act by the British Government naturally stimulated the German Colonial Society. The Chancellor said in the Reichstag, 26th June 1884, "Our view is not to found provinces, but mercantile undertakings; these, however, in the highest development." He laid down as the leading principle, "The flag follows trade." A start was attempted on these lines in West Africa, but completely failed at the outset. It was only in the Pacific that Prince Bismarck's ideal was, thanks to the dilatory attitude of British Ministers, possible. The "highest development" of Prince Bismarck meant the formation of trading and ruling companies on the English model. The head of the Berlin Disconto Gesellschaft "had for long been taking steps to secure a large area of New Guinea for Germany," and, accordingly, the German New Guinea Company was incorporated in the summer of 1884, and at the same time German agents were very active in combining science and politics in the Pacific, and it was well known to the Governments of Australia and New Zealand that these agents were looking for places that might be occupied by Germany; but these Governments, though supported by the Royal Colonial Institute and by Chambers of Commerce—especially by Scottish Chambers—could not move Lord Derby and Lord Granville, who would not be induced to depart from the hereditary policy of non-expansion in the Pacific, the policy that led Great Britain to give up the Philippines in 1764, and Java in 1817; that refused to accept Hawaii, Tahiti, and Samoa. Lord Derby professed to dread a war "with several millions of savage inhabitants" in New Guinea. An experienced Australian Governor had advised the Colonial Office that "as the expenditure on the Maori War had cost

£12,000,000, the acquisition of Papua might cost as much. Yet an administration has been established and maintained in Papua without a single soldier.

Count Münster had informed Lord Granville that a German expedition to the north coast of New Guinea was contemplated in 1880, and that this matter was under Government consideration. On 5th May 1884, the Chancellor read to the British Ambassador a despatch addressed to Count Münster for communication to Lord Granville, written on the avowed "do ut des" principle of Prince Bismarck, which was a sort of diplomatic ultimatum: that England should favour German colonial aspirations in return for support from Germany in questions nearer home, and stating that, if this were not accepted, he would turn to France. Lord Granville said later that he had never seen that despatch; and four days after its date Lord Derby informed the Australian Governments that "Her Majesty's Government are confident that no foreign power contemplates interference with New Guinea."

On the other hand the Governments of Australia and New Zealand have always been afraid of foreign annexations in the Western Pacific. In 1848 Sir George Grey, Governor of New Zealand, drew the attention of the British Government to this danger. The Sydney Convention of 1883 informed the British Government that "further acquisition of dominion in the Pacific, south of the equator, would be highly detrimental to the safety and well-being of the British possessions in Australia, and injurious to the interests of the Empire." In the same year the Agents-General informed the Secretary of State for the Colonies that for "over thirty years the Australasian Colonies have, one after another, pressed upon Her Majesty's Government the expediency of bringing the Islands of the Western Pacific within the Dominion or the Protection of England." Though thus keenly alive to the danger of foreign annexation, the Australian Governments had desired that the Islands should be put under the British flag at the expense of the British Government, and they had haggled over the expenditure of a few thousand pounds a year on this matter in a narrow parochial spirit. But so far as New Guinea was concerned the financial obstacle was removed by Queensland offering in 1883 to bear the expense necessary for securing that country.

The whole affair was handled in such a way that Prince Bismarck understood that he had a free hand, and in September 1884, at the time of Lord Derby's comforting assurance of non-interference, orders were issued to German ships of war to hoist the German flag on the north-east coast of New Guinea and elsewhere; but active German agents did not wait for their arrival. Dr. Finsch, who for some four years had been co-operating in preparing the way, left Sydney after dark, on the *Samoa*, 11th September, built a house and hoisted the German merchant flag on it on the north-east coast of New Guinea, 17th October 1884, a date which he says in his account of the matter "will always be a memorable day in the colonial history of Germany." He adds that "the first German Station on the coast of New Guinea was thereby founded." When the Reverend Dr. George Brown went to New Britain

in 1875 to found the Methodist Mission in that archipelago there was not a single white resident in those islands. All these places, and German New Guinea, were, however, formally and officially annexed by Germany, reversing the principle of "the flag to follow trade."

The people of Australia had not forgotten these occurrences, and a combined naval and military expedition against the German possessions was, after the declaration of war, promptly fitted out by the Commonwealth Government, and by the 9th September, little more than a month after the beginning of hostilities, the German wireless station at Nauru was put out of action; and the Herbertshöhe wireless station, and Rabaul, the seat of Government, were captured and garrisoned by the 12th of the same month. The capture of all the adjacent islands speedily followed, but after resistance that cost some valuable lives.

At the present time these German possessions are, with the exception of the civil administration of Nauru (and of Samoa, which is occupied by New Zealand), being governed by the Commonwealth.

The Governments of the Australasian Dominions were informed by the Imperial Government, 7th August 1914, that they would perform a great and urgent Imperial service if they would seize the German wireless stations in the Pacific. They were at the same time warned that "any territory now occupied must at the conclusion of the war be at the disposal of the Imperial Government for purposes of an ultimate settlement." They were a little later instructed that "the British flag should be hoisted in all territories successfully occupied by His Majesty's forces, and suitable arrangements be made for temporary administrations; but no proclamation formally annexing any such territory should be made without previous communication with His Majesty's Government."

The above are the conditions under which the Islands are now occupied by Australia and New Zealand for the British Empire.

The laws and customs of the Islands are to remain in force so far as is consistent with the military situation. The German armed forces surrendered, with military honours, and certain German officials were, on taking an oath of neutrality, retained in office. Those not so retained were sent to Australia and could return to Germany. The Governor was treated with respect and courtesy, and was sent to Sydney.

The conditions under which the Australasian Governments are representing the British Empire in the occupation of these German possessions should be collated with the announcement made by the Prime Minister of the United Kingdom, that, under a resolution passed by the War Cabinet, the Dominions and India will in future have an adequate voice in the foreign policy and relations of the Empire. Definite statements have been made several times in the House of Commons, that the Imperial Government will not make peace without first consulting the representatives of the Dominions. It is therefore certain that the Australasian and Canadian Dominions will have a voice in the final disposal of the German Pacific possessions at the end of this war. In this connection it is well to remember that Canada has a great stretch of territorial waters on the Pacific; that she will have an enormous trade to the Asiatic side, and to the Australasian Dominions

in the south. And we must not forget that the Canadian and Australasian possessions of the Empire have an area greater than one-half of the whole, by 1,200,000 square miles, with enormous potentialities for the overflowing population of the motherland; and we should remember that the population of the continent of Australia is more British than Scotland is Scottish, in the ratio of something over 95 per cent. as against 91·7 per cent.

So far as regards the Western Pacific it may safely be predicted that sooner or later all the former German possessions in that area south of the Equator must pass into the hands of the Commonwealth. Were that Government to follow the wise and cheap purchase method of acquisition so successfully practised by the United States, it would probably have to be a very high price that would tempt France to part with New Caledonia, so valuable to her as the source of the necessary nickel for armour plates, and on account of the cobalt and chrome obtained there for tool-steel.

But as New Caledonia is no longer a convict station the great objection to it in French hands has ceased to exist.

To a proposal that the Commonwealth should be entrusted with the permanent and irresponsible administration of the islands of the Western Pacific it might with some force be objected, that the Australian Governments did not enjoy the reputation of having exercised paternal government or care over their own indigenous population. Much could be said in their defence in that matter. In recent years, however, when it was practically too late to preserve the race, a great deal has been done for the Australian aboriginals. What to us is now of real importance is, that Papua since 1901 has, under the Federal Government, been administered on the same lines, and as well governed as it was when more directly under the Colonial Office. The Commonwealth Government, through a wise and very able Lieutenant-Governor, the Hon. J. H. P. Murray, C.M.G., have maintained the Papuans in their rights to land, kept alcohol from them, and treated them as humanely and justly as had been the case before 1901. And this has been done by whatever political party was in power in the Commonwealth.

Shortly after the German possessions passed into the hands of the Commonwealth officers a mistake that was intrinsically very regrettable was made. A regulation dealing with the recruiting and working of native labourers was issued under which the employer could be authorised to flog; imprison with or without chains, or with or without light; or fine a labourer. After about a month this regulation was withdrawn, and an amendment was substituted that puts flogging practically under the same restrictions as in Australia; that it can be imposed only by order of a properly constituted court, and a heavy fine or imprisonment is imposed on any employer that flogs a labourer. It may seem paradoxical to say that it was fortunate that the mistake was made of issuing the first regulation. But it is one more proof that the Commonwealth Government will insist on the natives under their jurisdiction being fairly and justly treated.

It may be that the flogging regulation was in accord with the laws

in force under German rule; but it certainly was not in conformity with British administration.

The Value of the German Possessions.—The professed desire of the Germans for colonies has been, that they should derive from them the raw materials they require. These Pacific colonies held by them would undoubtedly be important in that respect. Great sums of money have been expended by them, and very extensive plantations of tropical products have been made. Large numbers of labourers have been imported from China, Japan, and Java, and their employers, as hard taskmasters, have not failed to make the most of them. The Mariana, Caroline, and Marshall Islands are not free of typhoons that at times do much damage, but those Islands, in spite of that drawback, furnish great quantities of coconuts, which, thanks to modern chemistry, have come to be of great value as food for man and beast.

The greatest direct source of wealth ready at hand in these Islands consists of the Phosphatic Deposits. These phosphates have been accumulated there by countless birds during many millenniums. Every person knows now that phosphates, nitrates, and potash are indispensable in intensive cultivation; and if there is truth in what we are told daily by politicians, that there is a coming universal scarcity of food, it follows that intensive cultivation must be assiduously practised. The former German Island of Nauru will be able to assist greatly in this matter. It lies within half a degree south of the equator. It has an area of three square miles, and has 1538 inhabitants. It rises only 20 feet above sea-level. It has no harbour, but has been furnished with the means of loading phosphates at the rate of 100 tons an hour. According to Dr. Paul Hombrun it contains about 180,600,000 cubic metres of 83 to 90 per cent. of tricalcium phosphate, probably the richest phosphate found anywhere. There are also large deposits of high-grade phosphate on the Island of Angaur, at the south end of the Pelew Group, at present in the occupation of Japan, but the deposits there fall far short of the enormous quantity on Nauru. There are probably some 12,500,000 tons of high-grade phosphates in the British Ocean Island, now included in the young British colony of the Ellice, Gilbert, Phœnix, and Union groups. It seems that there are also great and rich deposits, estimated by some authorities at 10,000,000 tons, on the French island of Makatea.

Although Nauru has by far the greatest amount of the high-grade phosphates, Germany had not before the war the monopoly of phosphates that she practically possessed in potash. Some time before beginning this war Germany, by the Government monopoly of the Haber and Serpek methods of fixing nitrogen from the air, secured the manufacture of nitrates for munitions and manure. Her potash deposits are practically inexhaustible. If she receives back Nauru and Angaur she will be in a most enviable position as regards these three essentials.

That there are valuable minerals in German New Guinea is certain. Gold, coal, copper, osmiridium, and many other minerals have been found in Papua, and the same geological formations extend into German

New Guinea. The east half of New Guinea has a great asset in water power.

It adds enormously to the value of German possessions south of the equator that they are not in the zone of hurricanes (with the exception of Samoa). German New Guinea, the Solomon and New Britain groups, are practically free of these. On many of the Islands the soil is rich, so that the German Possessions in the Pacific, with an area of 94,000 square miles, and a native population of 419,000, could, under good administration, create a great trade in the not far-distant future. If the German Possessions now administered by the Commonwealth were added to Papua, it would make a great and valuable dependency of 200,000 square miles, and 800,000 native inhabitants, in which every variety of tropical fruit could be grown, including, besides the coconut, maize, rice, sago, tapioca, arrowroot, tea, coffee, cocoa, and many other food articles. Great fisheries also exist there, with trepang, pearl-shell and pearls; and there are very extensive forests.

The United States in the Pacific.

Of the nations that, besides ourselves, are directly interested in the Pacific the first place, in 1914, was undoubtedly held by the United States, the latest arrival.

The advent of the United States in the great ocean may be dated from the expedition of Wilkes, carried out in the interests of science and commerce from 1838 to 1842. Wilkes is to the United States what Cook is to England.

Alaska.—The first territorial acquisition by the United States on the Pacific was Alaska, obtained from Russia by purchase in 1867. This very profitable bargain, with certain treaties between the United States and Great Britain, practically settled definitively the Northern Pacific on the American side.

Hawaii.—Hawaii has an area of 6500 square miles. The largest island of the group is Hawaii, of an area of 4210 square miles. It was annexed by Resolution of Congress in 1898, and became a Territory in 1900. It is said that the group was discovered in 1542. It was rediscovered by Cook in 1778, who lost his life there in the following year. In 1843 France and Great Britain guaranteed its independence. In recent years the interests of citizens of the United States had become so great in Hawaii that, when a state of chaos had arisen in consequence of the extinction of the male line of the royal house, the Government of the United States experienced what has so often fallen to the lot of Great Britain—annexation was forced on them.

When the group was discovered by Cook the population was about 200,000.

In 1916 the pure-blooded indigenous inhabitants were in number about 24,000, the part-Hawaians 15,300; and the total population of 238,000 was made up of 97,000 Japanese, and the rest of Filipinos, Chinese, and Portuguese, with smaller numbers of American, British, Germans, etc. The case of Hawaii is thus severely illustrative of the

low vitality of Polynesian races in contact with white men. The exports of 1916 amounted to about £14,000,000, in which sugar figured for £11,500,000 and pine-apples for £1,500,000.

The volcanic soil of Hawaii is highly fertile and productive, yielding as much, it is said, as five to seven tons of raw sugar an acre. All tropical products can be grown there. The most advanced scientific methods are skilfully employed in the agriculture of the group. It is very greatly to be regretted that the humane, considerate Government of the United States, with its scientific methods and humanitarian ideals, was not established much earlier in that group.

The Philippine Islands.—The Philippine Islands formed an integral part of Spain, if not from the time of Magellan, at least from 1569 till 1898, when, after the Spanish-American War, they were ceded to the United States for a payment of £4,000,000. They have an area of 115,000 square miles, and a population—the best part of which is of the Malay stock, but there are also tribes of negritoes—amounting, all told, to about 9,000,000. The Islands number 3140, of which 1472 are not yet named. Some nineteen dialects are spoken in the group. Their trade in 1916 amounted to about £22,000,000, imports exceeding £9,000,000, and exports over £12,000,000. A complete Civil Administration has been established, with a Senate of 24 members, and a House of Representatives numbering 90. Of this Legislature the Governor-General nominates two Senators and nine Representatives on behalf of the non-Christian tribes. An advanced educational system has been introduced, and highly qualified medical officers have carried on research work there of great importance in tropical sanitation.

It is almost forgotten now that Henry VIII. thought of buying the group when it was in dispute between Spain and Portugal. Probably he found that he would have to pay a big price to each claimant, and he therefore turned his attention to finding a new route to Cathay on his own account.

The Philippine Islands are capable of immense development both in the vegetable and mineral kingdoms. In the first six months of 1914 the exports comprised coconut products to the value of £1,375,000; sugar, of £1,230,000; hemp, of £4,075,000. The group is rich in minerals, hardly yet worked—gold, silver, platinum, copper, iron, lead, zinc, mercury, sulphur, petroleum, salt, kaolin, and brown coal.

The possession of the Philippines now puts the United States, like the British Empire, astride of the Pacific, so that the interests of those two nations in that Ocean are on a very special footing as compared with other Pacific Powers.

Guam Island.—The largest and the most southerly of the Mariana or Ladrone Islands was acquired by the United States in the same manner as they obtained the Philippines. Guam lies in the direct route from San Francisco to Manila, the capital of the Philippines. It is 5044 miles from the former and 1506 miles from the latter. Its area is about 210 square miles, with a population of 14,000, including a naval garrison of 650. It has a good roadstead, and is a very convenient coaling station. A few years ago "Guam" was the fictitious

place for which vessels trading in the Western Pacific used to clear when the master did not know his destination or when he wished to conceal it from others. Guam has now a fine garrison; a thorough system of primary education; a telephone service; a modern water supply: and is in telegraphic communication with all parts of the globe. It was occupied and neglected by Spain from 1688 to 1898.

American Samoa.—As far back as 1872 the United States obtained certain interests in the harbour of Pagopago in the Island of Tutuila. This harbour is held to be one of the very best in the Pacific. The port has a coaling capacity of 4200 tons. Tutuila and the five adjacent islands under the American flag have an area of nearly 100 square miles, and a population of 7250. This group passed definitively to the United States by treaty in 1899. Pagopago is 1580 miles from Auckland, and 2354 miles from Sydney.

Wake Island.—Wake Island, which is 2000 miles from Hawaii, and 3000 miles from Hongkong, in a direct line between those places, was annexed by the United States in 1898.

According to the *World Almanac* for 1918 the United States claim a number of other small islands in the Pacific, "some hardly more than rocks or coral reefs." "They are of little present value, and mostly uninhabited. The largest are Christmas, Gallego, Starbuck, Penrhyn, Phœnix, Palmyra, Howland, Baker, Johnston, Gardner, Midway, Morell, and Marcus Islands. The Midway Islands are occupied by a colony of telegraphers in charge of the relay in the cable line connecting the Philippines with the United States, in all about forty persons."

These Pacific islands in the possession of the United States have a total area of about 121,000 square miles, and a population of some 9,250,000. Only the Philippines and Hawaii are producing countries; but the islands of Guam, Wake, and Tutuila are most advantageously situated as places of call on the long trade routes between the United States and the great countries on the other side of the Pacific.

The Panama Canal.

The greatest achievement of human labour and perseverance the world has ever seen is the Panama Canal, now the entry door of the Pacific from the New World, the completion of what Nature had intended to effect, but left as a test of the enterprise of our mighty American ally. It opens a gateway from the Atlantic to the Pacific, and completes a clear passage to the navigator round the waist of the globe, a passage sought in vain by Magellan and Cortes. The idea of a canal arose in the sixteenth century. The influence of this gigantic undertaking is not yet by any means fully appreciated. Its total cost is put at £75,000,000. It is 50 miles in length from deep sea to deep sea; has a minimum depth of 41 feet, a width at the narrowest point of 300 feet, and rises to a height of 85 feet above the sea. Its transit occupies from nine to ten hours.

The number of vessels that passed through it in 1917 was 1876, of

which 780, or 41·5 per cent., were British. It is open to all nations on the same terms.

It shortens the distance by steamer from New York to

Yokohama by 3729 miles, Sydney by 2542 miles,
Shanghai by 1629 miles, Wellington by 306 miles.

It shortens the mean distance between Europe and New Zealand by 1600 miles, and brings Callao nearer to Liverpool by 4320 miles, and Valparaiso by 1813 miles.

Japan in the Pacific.

In 1914 Japan held, outside of the Japanese Empire proper, only the Bonin Islands. These have an area of about 38 square miles, and have had a chequered history. They were used by the Japanese from 1493 as a criminal colony, and were abandoned by them in 1725. They were taken possession of by Great Britain in 1827, and by Russia in 1828, and were reoccupied by Japan in 1876, after a settlement had been formed on Peel Island by people from Hawaii. Although the first opening of Japan to Europe and America is within living memory, Japan has developed such marvellous aptitude for the sea as to be now regarded as "the Britain of the East," with her flag on every ocean, with a powerful and efficient navy that has rendered us very valuable and important assistance in this war. In a very brief space of time after the opening of hostilities Japan dominated the German possessions in the Pacific north of the equator; and in conjunction with a British contingent put an end to German occupation in China also. Japan is now in occupation of the German islands north of the equator, and by this time will be well acquainted with their real value, which certainly is considerable, though the total area is barely 1000 square miles. They contain a population of 61,500. As Germany is exploiting the iron mines of France, so, no doubt, will Japan turn to good account the phosphates of Angaur, at the south end of the Pelew group. It will be remembered that Germany hoisted her flag at Yap, in the northern end of the Pelew Islands, to take possession thereby of the Carolines; that Germany and Spain referred the dispute to His Holiness the Pope, who decided that the Carolines belonged to Spain, but that Spain should allow Germans to trade there freely, and grant them coaling and trading stations. Germany finally purchased the whole group of the Carolines from Spain for £870,000, at the comparatively high price of about £2, 4s. an acre.

The area of the Marshall group of atolls is hardly 160 square miles, but yet supports a population of nearly 18,000 very enterprising natives. Of all the German ventures in colonisation the Jaluit Company was the most successful. It had a charter under which it was able to claim exclusive trading rights in the Marshall groups of islands. But this being in direct conflict with British treaty rights, and being violently unfair to British traders from Australia, much bitter contention arose over the unjust treatment of such firms as Burns Philp and Company of Sydney. It was only after long continued and vigorous protest that

these wrongs were removed by the cancellation of the charter, and the establishment of administration under the German Imperial authorities. What the final disposition of these German colonies north of the equator may be eventually it is not possible to say, but if Japan is asked to quit, it may be that the answer will be the historical one, "*J'y suis, j'y reste.*"

French Possessions in the Pacific.

Of these the most important is New Caledonia, discovered and named by Cook in 1774. It contains with its dependencies an area of 7500 square miles. According to Fritz Sarrasin, the population of New Caledonia proper was, in 1913, less than 20,000 whites, inclusive of military and officials, while the indigenous population had decreased from 26,000 in 1885 to 17,000 in 1913. The first white settlers were Catholic missionaries, who were driven out and returned several times from 1843 till the annexation by France in 1853. New Caledonia, to the great detriment of its development, was used by France as a convict station, to which by 1898—when the practice was discontinued—some 15,000 to 16,000 *déportés, transportés, et relégués* were sent out from France, of which some 250 reached Australia in ten years. New Caledonia is connected by cable to Bundaberg in Queensland. Its wealth consists of minerals. In 1912 the exports comprised 74,308 metric tons of nickel ore, and 5100 tons of metallic nickel. In the same year the export of cobalt and chrome ores was over 50,000 tons. It contains also much iron, but, as pointed out by Mr. Compton, this is of no value in the absence of smelting coal. It has been estimated that the island contains 1600 square miles fit for agriculture, but this industry has to contend with droughts and violent hurricanes. In some of the dependencies, such as the Loyalty Islands, the natives are a fine class of men.

Oceanie, the second French Government in the Pacific, extends over the Society Islands, the Marquesas, and a number of groups of islands, with a total area of 1500 square miles, and a fast decreasing population of some 30,000. The Marquesas group when annexed by France had a population of 50,000, and now counts about 4000. Like the German possessions in the Pacific, those of France are practically commercial settlements. Great hopes are centred on the phosphates of Makatea Island.

The French annexations in the Pacific began with Tahiti; its Queen, Pomare Vahine I., asked for the protection of Great Britain in 1825, but this was refused. The request for protection under the British flag was renewed in November 1838, and "the protection of her good offices to Queen Pomare in any differences which may arise between Queen Pomare and any other Power" was promised in the name of Queen Victoria. In 1802 and 1811 the Governors of New South Wales appointed magistrates for Tahiti. These French islands lie on the route from Panama to Auckland.

Magnificent work was performed in the Pacific by the great French navigators and scientists in the expeditions of Bougainville, Baudin, d'Entrecasteaux, Lapérouse, Dumont d'Urville, and others who have left in that ocean a great and indelible record of honour, a proof of

which presents itself, for example, in the long list of French names on the map of Eastern New Guinea. It is, however, not possible to say that the first annexations made by France in the Pacific were carried out in the spirit of the high-minded, considerate, and illustrious navigators mentioned above. The first divine service held in that part of the globe took place on board the mission ship *Duff* at Tahiti on Sunday, 5th March 1797. Trouble began with the arrival of rival missionaries in 1836, and this eventually led to forced annexation, followed by an insurrection and much trouble.

Of Clipperton Island it is hardly necessary to speak, except that it serves well to illustrate the keenness with which rival nations vie with each other for the smaller remote islands of the Pacific. It lies on the direct route from Panama to Hawaii, has no population, has an area of 2·31 square miles, and is believed to contain guano. It is claimed by France, but the claim is disputed by Mexico.

The total possessions wholly French in the Pacific amount, according to *L'Annuaire du Bureau de Longitude* of 1915, to 8899 square miles, with a population of 82,157.

Of *Russia in the Pacific* it is unnecessary to speak, beyond recalling the fact that when she was herself she performed much good exploratory work in the Pacific. She at one time wished to have a footing in Tahiti, but did not press this on the unwilling natives.

New Zealand and the Pacific.

If the geographical position of Samoa is considered it cannot be a matter of surprise to any one to hear that New Zealand has frequently during the last six-and-forty years desired to see that group under the British flag. She offered to effect that in 1872, but was not allowed to do so. Samoa has not undeservedly been called "The Pearl of the Pacific" on account of its strategic position and its fertility. If New Zealand entertained the wish to secure Samoa for the British Empire before the building of the Panama Canal, she has now 1600 additional reasons, each a mile long, for doing so, because that is the distance by which the canal shortens the journey from this country to the New Zealand coast. But more than that, Samoa is in the middle of the highway that connects New Zealand with the United States on the Pacific, and with the great northern Dominion of Canada. Samoa, no doubt on account of its commanding position on these trade routes, has been an object of covetousness not only to New Zealand but also to Germany and the United States. Stevenson has said of the last-named Power there that her hands are not immaculate, but that they are cleaner than the hands of the others. At one time Samoa was ruled by a single king; but the people were broken up into hostile parties when the intrigues of rival nations began there. The Germans had the advantage of being represented in Samoa for many years continuously by a man who was much more able, and who was more strongly and consistently supported by his home government than were those that acted intermittently, and with doubtful support, for the

United States and Great Britain. On 21st April 1877 a deputation of Samoan chiefs arrived in Fiji to ask through the High Commissioner and Governor of Fiji for the protection of Queen Victoria. The High Commissioner informed them that their petition was too vague, and that therefore he could not advise that it should be granted. The United States similarly refused to accept Samoa about the same time. On 5th November 1885, Samoa was a second time offered to Great Britain by Laupepe, Tamasese, and forty-eight great chiefs, and was again refused.

In 1878 the United States obtained definite rights in the harbour of Pagopago, to establish a coaling station there. In 1879 Germany acquired the harbour of Saluafata, and Great Britain also got a coaling station. The same year saw Samoa with two rival kings, and the unfortunate Samoans were, through the rivalries and intrigues of foreigners, in constant tribulation up to 1889. In March of that year there were in the harbour of Apia three German ships of war, the *Olga*, *Adler*, and *Eber*; and three American, the *Trenton*, *Vandalia*, and *Nipsic*, watching each other with no friendly feeling. The British cruiser *Calliope*, commanded by Captain Kane, was also there. Very little would have made the guns of the American and German vessels go off on their own account. The state of feeling that existed was that of the old story of Captain Josiah Tatnall at the mouth of the Peiho, 25th June 1859, that "blood is thicker than water." The United States and the British were there together opposed to the German pretensions. A violent hurricane intervened and cleared the highly charged political atmosphere. Stevenson describes the harbour at Apia as a bottle with a high shoulder surrounded by a reef, and open by the mouth to the north. On the 15th March the seven ships of war and six merchant vessels were in the harbour. By two P.M. the rough weather was attended by a drop of the barometer to 29·1; then, as Stevenson says, was the time when all should have made their escape to the open sea as the wind and sea came straight into the harbour. Only the *Calliope* went out, and the other twelve vessels went to the bottom or were cast on the reefs or grounded.

The outcome of this calamity was politically the establishment of an impossible tripartite *condominium*, with another decade of intrigue, strife, and misfortune for Samoa, from which Great Britain fortunately emerged in 1899, receiving compensation in Tonga and in the Solomon Islands. Tutuila and its five adjacent islands passed definitively to the United States, and Germany took the rest of Samoa.

Before this war New Zealand had already a chaplet of small islands extending through the Kermadec and Cook Groups up to and beyond the latitude of Samoa, including the fine harbour of Suwaroff, and other islands still farther north. Before the month of August 1914 had closed a naval and military expedition from New Zealand had occupied German Samoa.

There, as elsewhere, the Germans had been very industrious, and had made some very fine plantations. Stevenson estimated that in his day they had laid out £200,000 in Samoa.

The relationship of Samoa to New Zealand is a very natural one, for Samoa is practically provisioned from New Zealand.

There are people in this country that talk lightly of giving back to Germany the colonies formerly held by her in the Western Pacific. It has to be considered that to surrender north-east New Guinea to Germany would be to British interests in Papua something like what German occupation of England would be to Scotland, or *vice versa*; that to allow Germany to return to Samoa would be to New Zealand what the occupation of Ireland, or Gibraltar, by Germany would be to Great Britain. The advocates of such restoration talk of its being made under a guarantee. "Rueckversicherung," it may be remembered, was a device of Prince Bismarck; it would be very necessary in this case if restoration took place, but is manifestly impracticable, for no other nation would be surety for a power that looks on a solemn international treaty as "merely a scrap of paper."

The New Hebrides.

There remains for consideration the troublesome question of the New Hebrides Islands. In 1840 they were included in the Charter of New Zealand. When Sir George Grey, as Prime Minister of New Zealand, raised for the second time the question of the New Hebrides, he was informed that they were no longer a part of that colony. It was chiefly due to the Presbyterian mission in that group, and to the Victorian Government, that Great Britain was not edged out of these islands. After no little trouble, a *condominium* was established between France and Great Britain in this group in 1906. It has an area of about 5100 square miles, and a population said to amount to 50,000. A *condominium* seems to be the last trench in political statesmanship. There must still be many men in Austria-Hungary that think with shame and humiliation on the *condominium* of Schleswig-Holstein. There was the Moresnet *condominium* between Germany and Belgium, renewed in 1905. We had one in Egypt, which was not happy in itself, but it pleased, and was very useful to, Prince Bismarck. Our experience of the same thing in Samoa was not by any means a blessing; and now we have this one in the New Hebrides, which is unfair to the colonising genius of the two Powers concerned, and is unjust to the settlers and natives of the group. It is to be hoped that this arrangement, with its attendant dangers, may be got rid of in the general settlement. Even a downright division of the group would be preferable to the present state of matters, which all that are concerned in or affected by it can only regard as a temporary and provisional expedient.

The Nations directly concerned in the Pacific.

The nations most concerned in the settlement of the Pacific that must take place after this war are:—The United States, Japan, France, Great Britain, and Germany. But the declared policy of the Entente Allies is that all nations, however weak and small they may be, are in

future to be heard, and their rights to be duly considered. No fair-minded man can dispute this principle, which, if carried out in its entirety, may lead to a convention in which thirteen Governments on the American side of the Pacific, and ten on the Asiatic side, would be represented as possessing territorial waters in that ocean. But the intrinsically greatest interests involved are predominantly those of the United States, Japan, France, and Great Britain. The difficulties of settlement might have been much less had there been any "No Man's Land" in the Pacific, but there is not only no such thing, but many parts are, on the contrary, claimed two or three times over. Manifestly, the question of most importance is what is to be done with the former possessions of Germany. It may be that although there are so many youthful and vigorous nations, and some powerful rejuvenated old ones, on the Pacific, their interests cannot be dealt with separately and apart from other regions of the globe. It is to be hoped, however, that a binding agreement may be made among peace-loving nations against fortified camps and military and naval competition in the Pacific; and that no aggressive Power may be there, for vast as the Pacific is, there is no room there for Teutonic Weltpolitik.

It is also greatly to be desired that the nations of Europe and America may not forget that the duty devolves on them to consider the well-being of the native races of the Pacific Islands. No truthful man can say that this duty has in the past received, as it should have done, the first consideration. It is a pity that at any convention for the settlement of the Pacific after the war, some power, or powers, that has no local interests to consider could not be appointed to represent and protect native rights. If one is to be guided by the recent past of Africa and the Pacific, one would conclude that the interests of the native and natural owners of those fair islands will be about the last thing that will be thought of.

It is all very well, as far as it goes, to respect the natural rights of small and weak nations; but it would be still better to go a step further and apply the principle to those that are still smaller and weaker, to the native inhabitants of the Pacific Islands. To those that attach but small importance to this ideal it may be pointed out that the Pacific Islands without the Pacific Islanders would be of much less value than they are now. I know those Islanders well, and can assure you that from every point of view they should be preserved.

INDUSTRIAL POSSIBILITIES OF THE FORTH ESTUARY.

By H. M. Cadell of Grange, B.Sc., V.D., D.L.

(*With Maps*[1] *and Illustrations.*)

As years roll on and the storm still rages over land and sea without a rift in the thunder-clouds that brood over the economic horizon, the

[1] The maps illustrating this article will appear with the second part.—Ed. *S.G.M.*

prophets may well lift their voices and cry aloud at the vision that opens before them. But unhappily for us a large section of the community has not yet awakened to the seriousness of the situation, and the prophets preach to deaf ears, like men crying in the wilderness to the stones and sand. On the one hand we see an appalling mountain of national debt towering higher every day, and on the other we observe light-hearted spendthrifts gaily planning how it is to be piled still higher after the war.

Like the grandchildren of the conquering Hebrews, large numbers of the present generation have come into a goodly heritage, a land full of wells that they digged not and vineyards and olive trees that they planted not, and they are even now planning to have an easy time when the war is over, with less work and more pay and everlasting peace and comfort all round. That certainly is the wrong road to Utopia, but the right one to the state of easy-going indolence and degeneracy that will end in final destruction by more strenuous races. The plain truth is that we will have to dig and plant diligently for ourselves, think harder, work harder, and live more plainly in future if the war is to end in a blessing and not a curse to what remains of the nation's manhood.

More capital must be created, not less, and the American Labour leader, Mr. Gompers, lately stated the truth very plainly to his party, and his words should be reiterated here, that if capital is destroyed, labour is destroyed with it. At such a time as this it is necessary to speak out, and, so far as experience goes, to direct the thoughts and energies of the community into practical and useful channels. But energy, however well intentioned and strenuous, may easily be misdirected. We do not need to go far afield to discover instances of loss caused by bad planning and ill-considered schemes. The Scotland Street Railway Tunnel under the New Town of Edinburgh is a small example, and the Caledonian Canal a larger one. How many useless and costly lines have been laid, and harbours constructed both here and in our Colonies for which there was no sufficient geographical or economic reason. Political interests have created railways in Australia that are now derelict, and industrial jealousy and greed have been the cause of much absolutely unnecessary and wasteful railway expenditure at home. Large corporations have often wasted vast sums on useless works for want of adequate initial consideration. The ambitious proposal by the Glasgow Corporation in 1914 to spend a million of public money on the (happily defeated) Loch Voil water scheme, which was admittedly not required, may be remembered in this connection.

Now that we are faced with heavy war taxation and many years of financial trouble and want, such extravagance must stop; the money to be spent must be well spent; the greatest economy, combined with the maximum of productiveness in every department, must be rigidly practised, and all kinds of waste avoided, if we are ever to win safely through this time of trial. Such geological, geographical, and physical resources as we have must be carefully scrutinised and turned to the best advantage, and our brains and man-power marshalled and directed towards the most useful and profitable channels of productive

activity. This investigation is already being conducted in various directions and places, and the following paper is intended to be a practical contribution to the discussion of the industrial possibilities of an important and well-defined part of Scotland, where there is wide scope for useful economic expansion in the near future.

Unlike the Clyde Estuary, the Firth of Forth is as yet only industrially developed to a very partial extent, and before the advent of the Rosyth Naval Base, the Estuary was, in spite of its great natural advantages, of comparatively little economic use to the country at large. Its trade had remained for years in a more or less stagnant condition, largely, I fear it must be confessed, on account of inadequate enterprise and foresight among its leading inhabitants. The writer may perhaps be pardoned for explaining that he has had thirty-five years of varied experience as a government geologist, a mining engineer, farmer, a resident land-owner, engaged in planting trees, building houses, working minerals, making miles of roads and streets, reclaiming land from the sea, and generally developing industry and improving his estates along the shore of the Firth of Forth and elsewhere, as well as attending to different branches of public business. He has, in such matters, been trained to strict economy, and can therefore lay some claim to discuss usefully the economic possibilities of the Forth Valley with which he is very well acquainted. He has often published papers on the resources of the district, but recent happenings and the needs of the time make the rediscussion of the whole subject a matter of ever-recurring public interest.

New Plans for the Future.—After the war, when the much hoped for time of peace arrives, all kinds of reconstructions are being talked of—garden cities and occupation for disabled warriors, better dwellings and conditions of employment, afforestation, small holdings, good wages, the means of finding contentment, and useful work for all.

In the pre-war days great industrial centres have grown up in which large districts have become more and more densely populated, and unhealthy congested city life has continued to perpetuate unnatural and undesirable conditions of existence. What is required now, it seems to me, is to plan so that trade shall not all be drawn into one or two squalid and dismal centres ; but rather that the people shall be able to live under more natural rural conditions and be reasonably near their work and near the fresh air and green fields also.

Geographical Conditions.—Now, in the Forth Estuary, which, properly speaking, begins above the Bridge and extends as far as Alloa, we find a part of Scotland where, except at Rosyth, the ground is comparatively thinly peopled, and there is ample room for an entirely new and healthy settlement and for a readjustment of the population on modern hygienic lines. In a country like this, where the larger part of the population subsists on industry other than agriculture, the inhabitants can only thrive where there are good natural facilities for trade and employment. Certain geographical conditions are required before any successful settlement can begin. If there is to be final success, and the foundations of a healthy and thriving community are to be laid

securely, the following among other conditions should, if possible, be present :—

1. Proximity to the sea, with good shelter and anchorage.
2. Flat ground along the coast for works, railways, and harbours.
3. A higher hinterland in the vicinity for residential areas.
4. Mineral resources, building materials, and adjacent coalfields.
5. Good soil for agricultural development and gardens.
6. A healthy climate and adequate gravitation water supply.

Local Advantages.—The Forth Estuary, or at least most of it, between Queensferry and Stirling has all these and other natural advantages in greater or less degree. It is fundamentally an admirable subject to work upon, and is capable, with judicious expenditure and comprehensive planning, of providing excellent sites where trade and industry can be carried on with the best results and the minimum of initial outlay and running cost, and where a large population can be spread over a wide riparian area.

It is quite probable that these suggestions may not appeal to the municipalities of the large cities already in existence, each of which is seeking to extend its boundaries and attract to its precincts a still denser population. But I am speaking not in the interests of any one community or place, but on the broader lines of national welfare and public economy. The health and welfare of any large community should surely be considered before the municipal ambitions of even the most benevolent of civic dignitaries. Rural and natural conditions of life should, as far as possible, be combined with facility for good employment where it can be created, and industry may well be scattered instead of concentrated, provided of course that such decentralisation can be advantageously and economically effected. A large part of the Firth of Forth might quite well be fringed, but not necessarily continuously, with groups of maritime works of various kinds, and the people employed in several of them might comfortably reside on the higher ground overlooking their purely industrial spheres of labour along the shore, according to the way suggested in the following pages.

Importance of the Firth of Forth.—The Forth Estuary has within recent years, and quite independently of the war, acquired a new degree of national importance. The south shore between Queensferry and Blackness forms the northern boundary of the important oilshalefield of West Lothian. Good seams of oilshale crop out at different places along the beach, and are being mined to within a short distance of the sea. The Fife coalfield on the north shore is now the most important in Scotland, and is capable of much development. Coal has also been comparatively recently opened up in the valley between Alloa and Stirling, and is being extensively mined close to the river at several places beginning at Bo'ness and Torryburn. The Rosyth Dockyard has completely changed the aspect of the coast between North Queensferry and Crombie, and what was ten years ago a quiet old-world strip of shore mainly agricultural, with quaint little red-tiled villages and declining trade, has sprung suddenly into a busy hive of industry capable of inde-

finite expansion. The naval base has quite lately stretched its activities over to Port Edgar, which was a practically derelict tidal harbour above South Queensferry, but is now an important place bustling with warlike activity. The extensive new docks at Grangemouth, opened for trade about fifteen years ago, will doubtless become an important gate for naval supplies to Rosyth from the West of Scotland, besides accommodating a large mercantile trade when the Firth is reopened for shipping after the war. There is good anchorage in the Estuary, which is well sheltered and capacious, and with all these favouring circumstances, both natural and artificial, the question of the better development of its varied resources is worthy of the fullest consideration now.

A New Plan required.—What is required is a well considered plan of campaign, and a definite and comprehensive scheme for the improvement of the navigation and the development of trade in the Estuary. In the past, under the old *laissez faire* system or want of system, the Forth, unlike the Clyde, has suffered greatly from want of any intelligent public attention to its requirements. The Clyde has largely been made what it is by the operations of the Clyde Trust, and the application for generations of human brain and enterprise, and the Forth, which is fundamentally a better subject to work upon, might and should in time be made of equal—if not still greater—value to the nation.

Three Geographical Divisions.—The Forth Valley between the Bridge and Stirling is geographically divisible into three distinct parts :—

1. The eastern section, extending from Queensferry to Bo'ness and Crombie, a distance of about nine miles, is two miles wide. The banks on both sides rise steeply from the beach to a height of about 100 feet, and there is little or no level ground along the foot of the slope on which extensive works or riparian towns can be built. At some places there is a narrow flat terrace between high-tide mark and the steep bank. This is known as the 25-feet raised beach, and is well suited for houses. The 100-feet raised beach is a higher terrace well marked at some places and absent at others. It is well developed to the west and south of Blackness, and affords another excellent building site, with a gravelly *solum*. The north shore as far west as Crombie Point, including the villages of Charlestown and Limekilns, is now practically all included in the Harbour of Rosyth, the western boundary of which extends across the Firth from Crombie to Carriden House, which is situated nearly two miles east of Bo'ness Harbour.

From Carriden on the south shore to Port Edgar, near Queensferry, Blackness is the only village on the coast. The old castle of Blackness stands on a rocky promontory extending for a quarter of a mile out on the foreshore, but not so far as low-water line. The Castle (see sketch) is in perfect preservation, and was until recently used for an explosive magazine and barracks for a few troops, but lately has been abandoned by the army authorities.

The rest of the south shore is at present devoted to agriculture, or is under woodlands or private policies, and is not naturally adapted for industrial enterprise, but parts of it might be developed as a residential area in the way suggested afterwards. As the whole of the north shore

opposite is practically monopolised by Government, and is being rapidly laid out for building, no suggestions fall to be made here as to its development.

2. The next section of the Forth Valley, ten miles in length, from Bo'ness to Alloa, includes the rest of the Estuary proper. On the south side the high ground recedes, and a broad tract of flat carse land, between Bo'ness, Grangemouth, and Falkirk, forms a level plain, nearly all situated a few feet above high-tide level. At the same time there is a wide stretch of foreshore to the west of Bo'ness, somewhat over 2000 acres in extent, where the tide at the broadest part recedes 1½ miles from the beach to low-water line. This is all covered with mud, and with gravel banks near low-water, and is eminently capable of reclamation. Above Grangemouth there is also a large mud flat of over 800 acres that might be reclaimed, and converted into good agricultural or industrial land.

The breadth of the Firth at low-tide is about 1½ miles at Bo'ness, and three-quarters of a mile at Grangemouth, and the deepest water is

Blackness Castle and the Forth Bridge.

along the north side, where the channel is eight to nine fathoms in depth. On the north shore, opposite Bo'ness, the high ground slopes steeply up from Torry Bay, but there is here no carse land, and only a wide muddy foreshore, also capable of reclamation.

3. The remainder of the tidal section of the river from Alloa to Stirling, a distance of five miles as the crow flies, is occupied by the windings of the Forth along its fertile links. The river is crossed at Alloa by the Caledonian Railway bridge, which has proved a great impediment to shipping in the upper reaches, difficult enough already amid the meanderings of the channel on the way to Stirling.

The Mud in the Forth.—The estuary above the bridge is all more or less muddy, but the mud is most conspicuous in the upper reaches above Bo'ness, where the foreshores are almost entirely covered with a deep bed of soft impalpable silt, and the "sleeches" or "sloblands" extend up past Grangemouth to Kincardine ferry. From Bo'ness eastwards past Blackness to Queensferry, the mud diminishes, and the foreshore becomes more sandy.

The subject of the origin and movement of the sediment in the water of the Firth has apparently never been scientifically investigated

or discussed, and the matter deserves some notice here. It is usually assumed that all the mud, which deposits in the harbours and causes great expense in dredging, comes directly down the river in the ordinary way, and will continue to remain a natural and necessary evil for all time.

Long observation, however, leads me to conclude that this view is quite erroneous, and that it may yet be possible to diminish greatly the quantity of suspended matter, and to clarify the water so as to obviate a large part, if not all, of the dredging that is constantly needed at present. Let us first consider the physical geography of the river, and the source of its supply and drainage area.

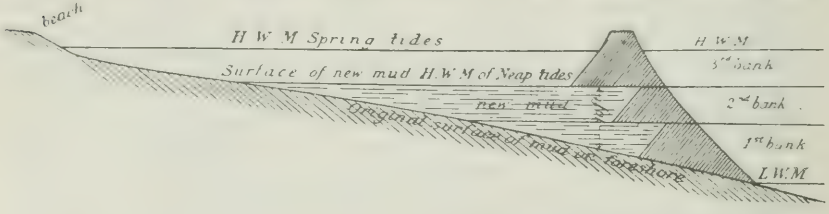
Sources of the Forth.—The River Forth above Stirling is fed by one large tributary, the Teith, and by a smaller one, the Allan Water. The Teith is a larger stream than the Forth, and indeed the Forth is really the tributary and the Teith the main river. Now, the Teith, like all rivers that issue from lakes, is practically at all times perfectly clear and free from suspended mineral matter, as it has been filtered by passing through Lochs Lubnaig and Vennachar, and in the last thirteen miles of its course between Loch Lubnaig and its confluence with the Forth, it cannot pick up much sediment except during times of abnormal flood. After heavy rain the Forth at Stirling is no doubt brown in hue, but it is to the clear cairngorm dye of the highland peat mosses, and not to the turbidity of suspended silt, that it owes its colour.

The Allan Water is likewise clear as a rule, although it does not flow out of a large lake. The Forth above Stirling meanders sluggishly along the Vale of Menteith between alluvial clay banks, but as it has reached what geologists call its base level of erosion it cannot deepen its bed any further, and its velocity is not sufficient to transport heavy sediment. It is fed by streams flowing off the Fintry Hills and the Ben Lomond ridge, and by the Goodie Water, a clear stream issuing from the Lake of Menteith. During times of flood the mountain burns and the Allan Water no doubt bring down some sediment, as do the Devon and the Carron Water, which enter the river lower down than Stirling. But for the greater part of the year the whole of these feeders are practically clear of sediment, and the load of detritus they transport during the short periods of flood is quite inadequate to account for the enormous quantity of suspended mud in the salt water of the Estuary. At most times of the year the Forth at Stirling is in fact a perfectly clear river, brown in colour, but fairly transparent and pure. No doubt the clay of the carse land and the sleeches has been *originally* all washed down as river alluvium, but that was the work of ages—of the many thousands of years that have elapsed since the Ice Age. If all the carse lands had been silted up as fast as the sheltered places and harbours in the Estuary, the whole operation could have been completed in a single lifetime.

Rate of Siltation.—The writer has had many opportunities of noticing the rate of siltation in the Forth. In 1889 a piece of foreshore, some thirty acres in extent, was surrounded by a low embankment of stones and rubbish at Bridgeness, just east of Bo'ness. The bank was made near low-water line when the tide was out, and at high

tide was covered by about 6 feet of water. The lower part of the foreshore, which at that place is 300 yards broad, was thus converted into a lagoon in which the water lay quiet, and could deposit its sediment at every tide. When the enclosed mud had risen level with the top of the great bank, a second was constructed above it, and when it was likewise buried, a third bank was finally laid down to exclude the tide from the intake, as shown in the accompanying diagrammatic section. The vertical scale of this is greatly exaggerated.

A regular record was kept of the rate of siltation over the whole area, and the average depth to which the mud accumulated was found to be about 1 inch per month, or 1 foot per annum, but at the beginning of operations the rate at some places was 3 feet in the first year. During storms and spring tides there was more precipitation of mud than during calm weather, or at neap tides when the depth of water on the bank was smaller. At the end of ten years the mud gauge showed that the rate of deposit had diminished, but during the whole period 10 feet of silt had been deposited inside the bank. By that time the foreshore had become so shallow that it was barely covered at high



Sketch showing accumulation of silt within successive embankments at Bridgeness.

water during neap tides, and as there remained room for so little water in the enclosure the rate of siltation was of course greatly reduced.

At other places in the vicinity the mud has been observed to silt up much faster. Two or three feet or more per annum have been noted, and since the war began I have been told that from the time the harbours were closed in November 1914, till the end of 1917, the mud had accumulated to a depth of 10 or 12 feet in some of them where no dredging had been going on during that period.

Origin of the Forth Mud.—Little reflection is required to convince the observer that all this sediment is not directly derived from the River Forth at all, and the question arises, Where then does it come from? Of late it seems to have become more plentiful than ever, and especially since the great dredging operations at Rosyth have been in progress. My answer is that most of the mud is derived from the adjacent sleeches, which in stormy weather are scoured by the rain when the tide is out or flogged by the waves when it comes in, the agitated suspended material being redeposited wherever the water is tranquil. There is also good reason to suppose that the mud is washed *up* the Firth as well as *down*, and is deposited in the upper reaches at high tide when the current is slack for a short time.

The Forth is open to the east, and sheltered from the west winds,

and on the south shore the spits and banks of sand and gravel on the beach tend to travel westwards up the Estuary, according to the prevailing play of the waves. Since Port Edgar pier was extended seawards in 1877-78, a great bank of sand has been drifted up on the west side, but the east side of the harbour outside the breakwater has remained clear. Inside the harbour the mud has silted up to a depth of several feet, requiring much dredging before it could be used again. The sand-bank on the lee side shows the direction of the prevailing currents and wave action to be from the east, and if sand can be swept westwards so can mud, but to a much greater degree.

These hydrographical and physical considerations may seem to have only a remote connection with the industrial possibilities of the Forth. But in reality they have, as I shall later on attempt to show, an exceedingly important bearing on a large part of the question.

The after-war development of each of the three sections of the Estuary may now be discussed separately.

The eastern section being inside Rosyth Harbour is mainly outwith the scope of this paper except in one important particular that may now be mentioned.

Blackness.—Port Edgar is now in the hands of the Admiralty, and is being rapidly extended for naval purposes. South Queensferry, to which Port Edgar is now being joined, is an old town, with a narrow and crooked main street, badly planned to begin with, on which local greatness has recently been thrust. It is becoming largely used by naval men and their families on shore, but what seems desirable is a better residential town or village, laid out *de novo* near the Naval Base, with more amenity for a pleasant existence, and well away from smoke and the noise of industry.

Now it must be noticed that the number of well situated, healthy, and convenient sites along the shores of the Firth of Forth for garden cities and villages above the Bridge is strictly limited. On the north side, west of Crombie, the shore of Torry Bay is very muddy, and the whole of the beach from Torryburn and Culross westwards has been quite destroyed in recent years, so far as amenity and access to the sea is concerned, by the N.B. Railway line from Kincardine to Dunfermline.

As has been noted, the whole Estuary above Carriden, on the south shore, is fringed with muddy foreshores, where there is practically no riparian amenity to lose. But below Carriden, for a distance of 5½ miles to Port Edgar, the water is somewhat clearer, and the foreshores and beaches are relatively clean and sandy, so that boating and bathing are practicable, and the beaches are such that children can play upon them with some pleasure, a thing that is naturally impossible farther up the river.

My suggestion therefore is that now, before any more works or railway lines are planned, this piece of the coast, including Hopetoun policies, should not be industrialised but permanently reserved for amenity and for residential purposes only, and that the village of Blackness, situated near the centre of it, should be turned into a residential garden city or village, for which it is in several respects very well adapted. Blackness

Castle—kept up by the Government, it is popularly, but it seems quite erroneously, supposed, according to the Treaty of Union in 1707—was used for nearly fifty years as a magazine for explosives, but has lately been abandoned, and it is now quite empty. It was formerly a place of great strength, and is directly opposite to Charlestown, a short distance west of Rosyth. The castle has a short open pier where explosives used to be shipped, but it does not extend to low-water mark. The pier might well be extended for use at all times of the tide, and a ferry established to Charlestown or Rosyth by which naval men could easily land either from their ships or from the north shore, and make their homes here in some degree of peace and rural quietness within sight of but well away from the smoke and bustle of the mushroom city of Rosyth.

Blackness is only two miles from Philpstoun Station on the N.B. Railway to Edinburgh, and to complete the scheme I would now suggest that a new road, less than three miles in length, be constructed up to the station on an easy gradient, on which rails should be laid for oil or petrol-driven cars to take passengers quickly to the main line. By this means an alternate passenger route from Rosyth to Edinburgh would be provided more convenient in some ways than the Forth Bridge route. A new road two miles long should also be made along the shore from Blackness to Carriden instead of the present footpath, so as to provide easy communication with the railway at Bo'ness three and a half miles off. Indeed the proprietor of Carriden estate, which covers two-thirds of the distance, has lately begun the construction of the western end of this proposed highway.

Another shore road could be advantageously made eastwards to Port Edgar. Before the Union in 1707 there was a shore road all the way from Bo'ness to Leith, I believe, known as the King's Highway, but it was closed for vehicular traffic long ago, and has since been all washed away by the waves. Recent developments point to the advantage of restoring the old King's Highway for the use of the lieges. It would make Blackness accessible from three directions.

The district will be well supplied with water when the new reservoir the County Council are constructing above Linlithgow is finished. Good quarries of building stone exist in the district, and there are excellent building sites in a healthy and pleasant locality in full view of Rosyth, so that the place has many natural advantages to recommend it.

Blackness Castle is a grim and unpicturesque fortress, with no features of architectural interest, but it might be greatly improved in appearance if it was planted with ivy or ampelopsis. It is not likely to be of much further use to the army or navy, but the powder magazine inside the great walls might be removed and the old courtyard restored as I remember it fifty years ago before the magazine was built. The building could be altered so as to be used for a veteran sailors' home or a club-house for service dwellers in Blackness, and let by the Government at a small rent to any society or public body willing to carry out such a proposal and keep it in preservation. The barracks and barrack-yard that were placed in the usual ugly military style outside the gate half a

century ago are modern structures, and could be beautified and let for dwellings or used as part of the proposed establishment. The castle has no important historic associations except as a prison for Reformers and Covenanters in the persecuting days of James VI. and the later Stuarts, and might well be permitted to add a final and happier chapter to its dim and dismal annals.

The second section of the Estuary may now be discussed.

Bo'ness.—The industrial fringe on the south shore begins at Carriden and extends to Bridgeness, Bo'ness and Kinneil, covering a distance of more than two miles of the coast. Bridgeness has a tidal harbour large enough for vessels of 1000 tons, and is mainly used for shipping coal from Bridgeness Colliery, but it is capable of enlargement, and wharfage facilities can easily be extended. The foreshore, about 300 yards broad, has lately been reclaimed in the vicinity out to low-water mark. The reclamation of more ground is still in progress, and there is a considerable and increasing area of flat land available for public works or shipbuilding close to the harbour. A ship-breaking company has been at work here for several years, and the reclaimed land is largely used for timber yards by importers of pitwood at Bo'ness.

Bo'ness Harbour and Dock, a mile west of Bridgeness, connected to the main line by a single line branch railway, belongs to the N.B. Railway Company, and in normal times is largely used for coal shipping and discharging timber from Scandinavia. The dock can take in ships up to 3000 tons capacity. The town has for industries collieries, potteries, woodyards, sawmills, chemical works, foundry and engineering works, and other branches of trade. It is well provided with water, gas, and electricity, and the part of the burgh on the higher ground overlooking the sea is laid out in handsome new streets for a growing population. There are excellent schools, including a secondary academy, and a golf course and other amenities of a modern kind. The population of the parish, which includes the burgh, is about 14,000.

To the west of Bo'ness, the foreshore, as has been said, opens out till it is more than a mile broad and is well adapted for extensive reclamation. Schemes have been proposed at different times during last century to embank large areas between Bo'ness and Grangemouth, but the only land that has been reclaimed here is a fringe along the shore somewhat over fifty acres in extent. This was mainly filled up by the slag from the Kinneil blast furnaces, which began work in 1853 and ceased operations more than thirty years ago, but a certain amount of colliery refuse is still being deposited on a part of the foreshore of Kinneil. Large bings of colliery rubbish surround the numerous old pits on the adjacent high ground, and these might be cheaply brought down to the sea for reclamation purposes, leaving the land clear for agriculture.

Along this part of the shore between Bo'ness and Grangemouth there is no amenity to lose, and if the foreshore were reclaimed there would be provided extensive sites for various kinds of works adjacent to low-water mark with tidal wharves alongside of them, while the low-lying part next the shore, not required for industrial operations, would make good agricultural land well adapted for wheat and beans and grazing.

Grangemouth.—The extensive harbour and docks belong to the Caledonian Railway Company, and extend across the foreshore to low-water line. These works, which form the latest reclamation of any size in the Estuary, cover 260 acres of the foreshore at the mouth of the Carron Water. The distance from the outer end of the Grangemouth Dock to Bo'ness Harbour is three miles as the crow flies, and a great part of the intervening foreshore in the bay is not covered by more than six feet of water at high tides. Besides the harbour, Grangemouth has for industries the timber trade and shipbuilding, and there is ample room as well as facilities for a great development of business. The docks are the largest in this part of the Firth, and can take in ships up to 5000 tons capacity, and, if the foreshores were reclaimed alongside the harbour, excellent sites would be available for industries connected with marine transport, or for shipbuilding on a large scale. Grangemouth, which is on the carse, and is well supplied with water, is near the Carron ironworks, and the large foundries of the Falkirk district are within three miles of the harbour.

Alloa is situated at the head of the Estuary proper, and has a small dock, owned by the North British Railway Company, used principally for shipping coal from the Alloa coalfield. There are two shipbuilding yards where vessels up to 300 feet in length are being built. The industries include engineering and agricultural machinery works, textiles, glass-blowing, and brewing. South Alloa, connected with the Caledonian Railway, is largely laid out for timber yards for imported pitwood. There is space for much development of shipping, but what is most wanted, both here and at Bo'ness and Grangemouth, is improvement of the channel for navigation.

River Conservancy.—The harbours of Bo'ness and Grangemouth, as well as Alloa are, as we have seen, greatly injured by the mud that steadily chokes up their entrances, and in normal times it costs the two former some £4000 to £6000 a year each to keep them clear of silt.

For many years the Forth has been greatly in need of a Conservancy Board, similar to the Clyde Trust, to dredge the channel, reclaim the foreshores, and generally to promote the trade of the Estuary and the shipping interest. The large harbours are all owned by one or other of the two railway companies, who have not shown very broad views as to the development of trade beyond their immediate and somewhat limited circle of vision. Each company has been too apt to regard the other merely as a competitor, and combined action in the public interest has not often been considered. Now that there is some prospect of a more national policy being adopted, the whole question of the development of the trade of the Forth may be simplified. The idea of a Forth Conservancy is not a new one, but the want of any cohesion among the various interested parties has hitherto prevented any practical steps being taken in the matter.

The total registered tonnage before the war of vessels entering and leaving the Forth ports above Queensferry was over four million tons a year, and after the war it may be much greater. The conservation and development of the Forth shipping industry is thus of paramount

importance. It is now more important than ever, and the proposal has the entire approval of the municipalities of Bo'ness, Grangemouth, and Alloa.

What is required in the first instance is a conference of representatives of the Admiralty, the riparian counties and municipalities, the railway companies, and the shipping, landed, and trading interests, to formulate some practicable scheme, and to obtain an Act of Parliament giving the proposed Board the necessary powers, including the power to levy conservancy dues on all shipping affected by its operations. If all interested parties were to agree enthusiastically to support such a Bill, so that it might be passed without opposition, and without unnecessary expense and delay, the first difficulty would be removed, and preliminary arrangements might begin, and the sooner the better, as there is much to consider before any practical operations can be commenced.

(*To be continued.*)

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

At a meeting of Council held on Monday, March 25th, Mr. John Mathieson, F.R.S.G.S., was appointed *interim* Honorary Map Curator in succession to Colonel Sconce, resigned. At the same meeting Mr. W. G. Burn-Murdoch, J.P.; Mr. W. L. Calderwood, Director of Scottish Salmon Fisheries; Mr. Harry R. G. Inglis; Principal A. P. Laurie, M.A., D.Sc., F.R.S.E., and Mr. A. Watt, M.A., F.R.S.E., Secretary to the Scottish Meteorological Society, were unanimously elected to fill vacancies in the Council.

The Diploma of Fellowship was conferred upon Mr. W. H. Menmuir, L.D.S., who has travelled extensively in Europe, and made a special study of the geography of Russia.

The following were elected members of the Society at a Council meeting held in January :—

Ordinary Members.	*Associate Members.*
Miss L. Lumsden, LL.D.	Miss J. C. Connor, M.A.
Miss J. C. Ross.	Miss I. Abel.
Arthur O. Cooke.	Miss I. Beattie.
Thomas Dunlop.	Miss J. J. Gillespie.
Harry R. G. Inglis.	Mr. M. S. Odabashian.
Major J. Hay.	James C. Barrowman, M.A.

The following were elected at the March meeting :—

Ordinary Members.	*Associate Members.*
Major J. G. Allan, D.S.O.	Miss E. M. Eaves.
Roland E. Muirhead.	Ernest E. Gomersall, B.Sc.
Rev. Hubert L. Simpson.	
Walter H. Young.	
William H. Menmuir, L.D.S.	

GEOGRAPHICAL NOTES.

EUROPE.

The Human Geography of Flanders.—Prof. Raoul Blanchard, who in the early part of last year was Visiting Professor from France at Harvard University, contributes to the December issue of *The Geographical Review* a very instructive article on Flanders, illustrated by two sketch-maps and a number of photographs. Some of the latter are taken from his book *La Flandre* (Paris, 1906), while others are new. All acquire a special interest at the present time in that they illustrate the scenery of the area in which continuous fighting has been going on for nearly four years. Both the photographs and descriptions, it should be noted, refer to pre-war conditions.

The article defines Flanders, as a natural region, as the area bounded by the North Sea, the Lower Scheldt and its estuary, the Dender River, a series of dry chalk ridges south of Lille, and the Heights of Artois. Politically, it thus includes parts of France and of Belgium. As thus defined the region is, of course, a part of the Anglo-Flemish basin, separated from the English sector by the Strait of Dover, and forming the counterpart of the Paris basin on the other side of the Artois anticline. It is thus a part of an extensive zone of submergence, floored entirely by soft marine sediments, consisting of clays, sands, and gravels. Before the formation of the existing Channel the area was tilted up to the south-west, and the original streams ran north-east. The largest of these consequent streams was that which flowed in what is now the Strait of Dover; remnants of the others persist as the Upper Aa, the Lys, the Upper Deule, the Middle Scheldt, and the Dender. These original streams formed broad and deep valleys, but since the beds were not equally soft, the clays being more resistant than the gravels and sands, a series of ridges were formed. Though greatly reduced these still persist, and form the hills and hillocks which have played so important a part in the fighting. The Passchendaele Ridge, near Ypres, though not topographically the most important, will always remain the best known here. With the invasion of the sea, which formed the Strait of Dover, a new base level was established west of the Flanders Plain, and brought about great changes in the drainage system. Thus the Upper Deule was beheaded and turned to the Lys, the Upper Dender was tapped by the Middle Scheldt, the Aa River, formerly a tributary of the Lys, found a separate exit to the North Sea. A very instructive little sketch-map illustrates these changes.

The formation of the Strait of Dover took place during the middle Quaternary, and at the same time the sea invaded all the Flemish valleys. Later it receded slightly, abandoning the Flemish valleys, but leaving an uncertain coastline, subject both to advance and recession of the marine waters. There were thus created two Flanders, the coastal plain, fully exposed to marine action, and inner Flanders, less flat, more forested, more varied. The essential Flanders is the inner belt, but the narrow coastal plain is of great interest.

The first point to notice is that this plain is not peculiar to Flanders, for the Flemish part, extending from Calais to Antwerp, is continued through Zealand, Holland, Friesland, East Friesland, and the marshes of Schleswig to Jutland. Second, as compared with Friesland, for example, it has undergone a marked change in quite recent time. The Quaternary sea withdrew gradually: a line of dunes rose on the seaward margin; behind these fresh-water lagoons filled slowly with peat. The silting-up process permitted human occupation, which begins with Neolithic man and can be traced through the time of the Gauls to the Romans. But, apparently in the fifth century of our area, a fresh invasion took place. This seems not to have been severe, but the plain behind the dunes was invaded by the sea at each period of high water, copious mud deposits were laid down, and the region in all probability took on the appearance of the present mud flats of Friesland behind the coastal fringe of islands. In course of time, quite independent of human agency, the deposits thickened to such an extent as to prevent the invasion of sea-water; grassy plains developed, and man returned, bringing with him flocks of sheep. A steady continuation of the process silted up the estuarine gulf, and the coastal plain became dry. But though in essentials the process was independent of man, he participated in it, notably in building dikes to keep out the sea from the old gulfs now become dry land, in striving to keep open the ports, and to drain the low ground behind the coastal fringe of dunes. The task of keeping out the sea, thanks to this coastal fringe, was far easier than that of draining the flat land within, and this has led to a marked difference in the life of the two areas.

The flats, clothed with thick grey mud, are extraordinarily fertile, but reclamation is costly and difficult. Thus farming can only be carried on by those with a considerable amount of capital, and on a large scale. The area is therefore not densely peopled, towns are few, and the actual manual work is largely performed by day labourers coming from inner Flanders. Cattle are fattened on the natural meadows, and valuable and exhausting crops like wheat, flax, sugar beet, and chicory are grown.

The life of the dune belt is different. Here the soil is less valuable, demands more labour, and is worked by small farmers. Fishing affords also another source of food, and the fishers always cultivate some land. The nature of the coast also makes it very suitable for bathing resorts.

From the coastal plain inner Flanders differs markedly. Here the soil is poor, demanding many fertilisers where it is sandy, and difficult to cultivate where clay predominates. Both small and large farms exist; the smaller holders depend chiefly for success upon continuous toil, while the larger have introduced many improvements, and cultivate their land in the most scientific fashion. The chief agricultural industry is cattle-raising. The cattle furnish, on the one hand, the needful fertilisers, while, on the other, the crops grown on the poor soil are as a rule better fitted for fodder than for direct use by man. But wheat, rye, potatoes, flax, chicory, tobacco are all grown. The population has been dense since the early Middle Ages, and the wool of the dune sheep,

together with the textile plants, early made manufacture possible, while the excellent position makes the import of raw material easy. During the nineteenth century the chief tendency was for the industries to concentrate in the large towns. On the other hand, before the war a contrary movement was in process, the factories, originally concentrated in the large centres, showing a tendency to migrate towards the rural districts, where labour was cheaper. The fact that living is much cheaper in Belgium than in France, owing to the protective tariff, is causing the industries of Lille to spread through the neighbouring towns as well as to increase. The labour employed is largely Belgian, the employees living on one side of the frontier and working on the other. The combination of intensive agriculture and industry gives rise to a very high density of population, so that the natural region of Flanders, with an area of about 3860 square miles, had at the outbreak of war a population of 3,250,000, or about 842 persons per square mile.

Africa.

Evidence of Progressive Desiccation in Senegal.—M. Henry Hubert, in an article in the *Annales de Géographie* for September 15, brings forward a certain amount of evidence tending to show that the region round the Senegal river is becoming progressively drier. He points out in the first place that, in regard to the Sudan, various opinions have been expressed on the question as to whether a climatic change is or is not going on at present, and there is already a fairly extensive literature dealing with the subject. On the other hand, the question has not yet been discussed for the French colony of Senegal. While admitting that the evidence which he is able to bring forward is not conclusive, he claims that, such as it is, it at least suggests progressive desiccation, becoming increasingly rapid of recent years. He draws attention, in the first place, to the ferruginous deposits, consisting of iron-containing grits and conglomerates, and laterites, which are to be found in Senegal and the neighbouring territories. In Guinea these deposits lie at the surface and cover beds of Eocene and Pleistocene age. But beginning at the Casamance river these beds are covered by a layer of sand, at first thin, but increasing rapidly in thickness towards the north. Now the ferruginous beds speak to a damp climate, and the fact that they are apparently still being formed to the south, but northwards have, as it were, become fossil, and are being invaded by sand, leads him to believe that the climate has changed, and that a new epoch, characterised by greater dryness, has been inaugurated. He next considers the dry valleys which occur between the Senegal river and the Gambia. The evidence, though somewhat incomplete, seems to suggest that the presence of water in these valleys is becoming more infrequent, as compared even with the period of the early sixties, when some observations are recorded in regard to them. One of these valleys, that of the Sine, has not had water in its bed for a period of eleven years, although place-names and local traditions seem to suggest that formerly it contained water at least during each winter season. The valley now shows signs

of becoming filled up with wind-blown sand. Again, there seems to be some evidence to show that the Senegal and Casamance are now bringing down less fresh water than they did fifty years ago. Once again, wells, both those of native origin and those dug by Europeans, are drying up, and in the northern part of the colony the population is decreasing by emigration, due to difficulties in the water supply, and to bad harvests. Among the crops ground-nuts especially are becoming less and less productive, apparently owing to increasing drought. M. Hubert's general conclusion, as already stated, is that while the country has been becoming progressively drier for a prolonged period, the desiccation has made very rapid progress within quite recent years. The evidence put forward does not, however, seem adequate to settle the question as to whether this recent increased dryness is or is not a temporary phase.

General.

South Orkney Meteorological Station.—From information received by the Royal Geographical Society through the Foreign Office, we learn that the Argentine corvette *Uruguay* left Buenos Aires on 18th February with a new staff for the meteorological and magnetic station on Laurie Island, to replace those whose time has expired. The chief of the Argentine Commission is Señor Ole Holm, who, together with another member, has already seen service on the island. Continuous hourly eye observations have now been maintained since March 1903 at this the most southern observatory in the world.

NEW BOOKS.

EUROPE.

An Old Gate of England: Rye, Romney Marsh, and the Western Cinque Ports. By A. G. Bradley. London: Robert Scott, 1918. *Price 6s. net.*

Mr. Bradley's versatile pen can always be relied upon to produce a readable book, whatever the subject, and the subjects of his writing have been many. In this case he possesses the advantage of residence in the district of which he writes, and the result is a volume of much variety and interest. A local history may too easily degenerate into a chronicle of small beer or a dry-as-dust miscellany. But here the narrative is interspersed with passages from national history, and digressions upon such subjects as smuggling, gentry in trade, the English country parson, snobbery, etc. The book would be worth reading for its digressions alone.

The special privileges of the Cinque Ports arose from their situation on the coast nearest to a foreign shore, and therefore most liable to attack. Their privileges were in return for war service, every freeman was a "Baron of the Cinque Ports," and ships of other ports had to dip their flags in salute. Small wonder if they were inclined at times to rustle it among their compeers, and that such irregularities occurred as when the Ports' ships, sailing with King Edward I. to France, suddenly turned upon the Yarmouth contingent, against whom they cherished a chronic animosity, and burned twenty ships, and slew nearly all the crews under the very eyes of the enraged king.

Their great days were in the fifteenth and sixteenth centuries, though, with the use of guns, and consequent larger size of ships, their special position as defenders of the realm upon the high seas had begun to decline. They suffered much from the depredations of the French corsairs, and with the decay of their harbours their glory departed.

But, besides their naval activities, the Portsmen in their day were brisk traders. Through the Ports entered the bulk of the fish which, salted or dried, formed a staple of the national food supply in Tudor and Stuart times. Later on smuggling became such a thriving industry that brandy factories were established at Schiedam and elsewhere solely for this trade, while wool (conveyed by "owlers") went in exchange.

All this time, however, the contest with the unruly waves was being carried on, and was being lost. In 1288 the old town of Winchelsea was transferred to a new site, where it affords a specimen of early town-planning strikingly similar to that of American cities of to-day. Ancient Winchelsea now lies beneath the sea just off Rye golf links. The harbours of Hythe and Hastings were blocked by drifts of shingle and sand. Romney and Sandwich were cut off from the sea by the same cause. The glory of the Ports has departed.

But in their old-world charm—most fascinating and elusive of all in the case of Rye—and in the stretches of beautiful country near them, they will always exert an attraction, and visitor and resident alike will feel grateful for Mr. Bradley's tribute. The book contains a number of illustrations.

AFRICA.

La Tunisie. Par J. L. de Lanessan, ancien Ministre de la Marine et Gouverneur-général de l'Indo-Chine. Second Edition. Paris: Félix Alcan, 1917. *Price 5 francs.*

The first edition of this important work was reviewed in the third volume of this *Magazine* in 1887. The present edition has been carefully revised and contains much new matter, bringing its description of the French protectorate of Tunisia thoroughly up to date. As the author remarks in his preface, "The chief object of this second edition is to describe the striking results achieved in Tunisia since 1887. Of all our colonial establishments, Tunisia is without question the one which has developed with greatest rapidity, which has occasioned the least sacrifices to the Home Government, and where the understanding has been most complete between the natives and the French. It is also the one which has been most productive of useful work with the smallest number of workers. The cause of this was owing to the Home Government conceding to it an independence, a self-direction, enjoyed by no other French colony."

The climate of Tunisia resembles that of Algeria. The four seasons are well marked, spring beginning towards the middle of March and lasting till the end of May, with a temperature of 18° to 25° C., and rarely any rain. Summer heat begins in the course of June and increases till nearly the end of August, the thermometer marking 25° to 30° C., and occasionally rising to 40°. The rains begin in autumn, at the end of September, and last till March, and are especially heavy during December and January. The thermometer then does not rise above 15° or 18°, and sometimes falls below zero C. (32° F.) A sufferer from gout informed the present writer that he considered the Tunisian climate superior to any other for his complaint.

In 1912 the population of Tunisia was 1,832,576, the Moorish (not the Arab) race being predominant. There were only 46,000 French out of 102,432 strangers).

Sicilians numbered 88,089, and Maltese 11,300. There were over 50,000 native Jews.

Lead, zinc, and iron are the most abundant minerals, while marbles, limestones, and sandstones are largely developed. Hot and cold mineral springs are numerous. Since the establishment of the Protectorate in 1883 the Tunisian forests have been preserved. Agriculture both by natives and Europeans forms a large subject of discussion in this volume, and statistics are given of various cultivated estates. After this we find details of the various industries, such as Mining, Phosphates, Salt, and Fisheries. With regard to Commerce, the total value of imports to Tunisia in 1912 amounted to over 156 million francs, of which France contributed 80 million, Algeria 17¾ million, and Britain 14½ million. As regards exports from Tunisia, in 1912 France took a value of 67¾ million francs, Italy 25 million, and Britain 13¾ million.

The author points out the improvements in the ports, roads, and railways of Tunisia since his last edition in 1887, and concludes an interesting and instructive volume by declaring that "the representatives of France in Tunisia have accomplished their duties towards the Tunisian people and the Home Government as perfectly as it was possible, with the result that the moral condition of the population is as good as could be desired after thirty-five years of occupation and administration by France." An excellent map of Tunisia is appended, showing railways in use and projected, forests properly so-called and mixed with brushwood, and the limits of the cultivation of alfa, a most important product of Tunisia, as it is one of the varieties of Esparto, and valuable for papermaking.

ASIA.

From Gallipoli to Baghdad. By William Ewing, M.C., D.D., Chaplain to the Forces. London: Hodder and Stoughton, 1917. *Price 5s. net.*

Not a few books have come out of the war that are frankly disappointing, badly written, badly arranged, leaving a confused notion behind of the things attempted to be described. Others have really afforded an excellent understanding of the scenes in which the writers have moved, and you rise from their perusal feeling you have obtained a clear conception at last of the doings of our gallant men, and of the spirit that animates them in victory and defeat, in peril and suffering. Dr. Ewing's *From Gallipoli to Baghdad* is an outstanding example of the latter class. If any one desires a distinct and well-defined setting of the heroic struggles on the Gallipoli Peninsula, and of the recapture of the surrendered Kut, and the taking of Baghdad, one could not do better than turn to his pages. He writes with a clear vision of the essentials of the awful combats our men engaged in with the enemy, and with nature in its wild moods on sea and land. His style possesses literary grace, and is brightened with unfailing humour. He never becomes dull or prosy, and has the faculty of illumining hazy or unintelligible phases of the operations. As a chaplain he was devoted to the soldiers, officers and men alike, and shared their perils and privations. The number of hair-breadth escapes he passed through were sufficient to try the nerve of any man. Only once was he wounded, when he marched with the Seaforths on Baghdad, and a piece of shrapnel caught him on the chin. His early days of missionary life in Palestine proved invaluable to him in meeting the vagaries of the Eastern climate, and in the understanding of Eastern customs. This also adds sureness to his touch in his descriptions, and enables him to contribute to our geographical knowledge of the regions he traversed. Speaking of the Tigris and of Kurnah on its banks, the traditional site of the garden of Eden, he says, "The view along the shore is

pretty enough, but in other respects it is not easy to think of conditions less Edenic. The neighbouring swamps are the home of malaria, and noxious insect life flourishes exceedingly. It is well to speak softly, if you speak at all, when you look in the glass after a night spent in this paradise. One lad volunteered the opinion that 'it wouldn't need an angel wi' a flaming sword to keep him out o' Eden.' . . . Above, the river becomes narrower, and its tortuosities begin. It twists and turns in the most disconcerting fashion, reminding one somewhat of 'the links o' Forth' below Stirling.' The total rise from the sea to Baghdad is only 111 feet. . . . For the most part it is a dreary prospect that meets the eye beyond the banks of the river. On all sides the plain stretches away to the horizon, with little to break the monotony of coarse grass and desert scrub. An occasional clump of trees marks an Arab village or saint's tomb; here and there the fragile cane-built shelters of an Arab community press down upon the shore, while at long intervals a square of mud walls encloses a more permanent settlement. The sun almost seems to pour down liquid fire, and a south wind burns like the blast from an open furnace. This land, which in ancient days nursed to strength the mighty empires whose history fills the records of the past, is now a vast wilderness of desert and morass, cut through by hundreds of channels hollowed out aimlessly by rising and receding waters. It ought to be one of the world's greatest sources of supply for food and fruit. It yields but a pitiful fraction of what might be won from its broad acres and deep, rich soil, and supports in an exiguous life a few handfuls of withered Arabs."

Britain's advent may produce a transformation. Egypt has produced its "miracles," why not Mesopotamia?

A sketch-map of the south-west end of the Gallipoli Peninsula is exceedingly helpful in understanding the various stirring episodes that happened there. It is a pity a like service was not done to illustrate the Mesopotamia campaign. An excellent photograph of the author and a number of illustrations enhance the interest of the book.

EDUCATIONAL.

Introductory Geography. By H. Clive Barnard, M.A., B.Litt. London: A. and C. Black, Ltd., 1917. *Price* 1*s.* 8*d.*

In this little book Messrs. Black have made another useful addition to their excellent series of Geographical text-books which have done so much to aid recent progress in geographical studies. This book is designed for young children from ten to twelve years, and aims at giving in simple language and in outline only the leading principles that underlie the more advanced treatment of geography on regional lines. The principles selected are those essential to our knowledge of the earth, and they are set forth in such a simple and interesting way that they should be within the understanding of the young. Each chapter is accompanied by a set of exercises. But while the text is so simple that it should serve for children under ten, some of the requirements of the exercises seem to be beyond the age intended. Here it may be stated that these exercises seem to be the most valuable part of the book, and as the author intends that they should not be regarded as optional, but as an integral part of the course, the answering of them under the guidance of the teacher should make up for anything lacking in the text. Instead of drawing maps as is required in most of the exercises, the filling in of blank outline maps is all that should be expected. The chapters on the natural regions of the world are to be commended, but the addition of a short chapter on the conditions of plant life would have been helpful. While the author carefully explains direction he makes no attempt to show how position is defined,

and while wisely insisting on constant use of the atlas, he shirks introducing the terms latitude and longitude. One of the most valuable points of the book is its wealth of illustrations, all of which are carefully chosen to illustrate the points dealt with, and some of which are more stimulating than additional pages of text. The book forms an admirable introduction to more advanced work, and should be welcomed by all teachers seeking to lay sure foundations in the teaching of geography on the best lines.

BOOKS RECEIVED.

Human Geography in Western Europe: A Study in Appreciation. The Making of the Future. By H. J. Fleure, Professor in the University College of Wales. Crown 8vo. Pp. vii + 263. London: Williams and Norgate, 1918. *Price 5s. net.*

My Round of the War: A Personal Narrative of War, Travel, and Adventure. By Basil Clarke. Crown 8vo. Pp. x + 303. London: William Heinemann, 1917. *Price 6s. net.*

A Frenchman's Walk through Ireland, 1796-7. (Promenade d'un Français dans l'Irlande.) Translated from the French of De Latocnaye by John Stevenson. Crown 8vo. Pp. x + 286. Belfast: M'Caw, Stevenson and Orr, Ltd., 1917.

Visual Geography: A Practical Pictorial Method of Teaching Introductory Geography. By Agnes Nightingale. Book III. Many Lands. Containing 24 page outline pictures for colouring. Medium 8vo. Pp. 48. London: A. and C. Black, Ltd., 1918. *Price 10d.*

The Guardians of the Gate. Historical Lectures on the Serbs. By R. G. D. Laffan, C.F. Crown 8vo. Pp. 299. Oxford: At the Clarendon Press, 1918. *Price 5s. net.*

Alsace-Lorraine. By Jules Duhem. Translated by Mrs. R. Stawell. Crown 8vo. Pp. 206. London: Hodder and Stoughton, 1918. *Price 2s. 6d. net.*

Frontiers: A Study in Political Geography. By C. B. Fawcett. Crown 8vo. Pp. 107. Oxford: At the Clarendon Press, 1918. *Price 3s. net.*

The Victims' Return. By Noëlle Roger. With an Historical Note by Eugène Pittard. Crown 8vo. Pp. 134. London: Constable and Co., Ltd., 1917. *Price 2s. 6d.*

The World We Live In. An Illustrated Description of all the Lands and Seas of the Globe, their Peoples, Animals, Plants, and Products. Vol. IV. Edited by Græme Williams, F.R.G.S., F.G.S., F.Z.S. With an Introduction by Lionel W. Lyde, M.A., F.R.G.S. Imperial 8vo. Pp. 697-984. London: The Waverley Book Company, Ltd., 1918. *Price 34s. for the four volumes.*

The Life of Sir Colin C. Scott-Moncrieff, K.C.S.I., K.C.M.G., R.E., LL.D. Edited by his niece, Mary A. Hollings. With Illustrations. Small royal 8vo. Pp. ix + 374. London: John Murray. *Price 12s. net.*

L'Allemagne et l'Amérique latine. Souvenirs d'un Voyageur Naturaliste. By Émile-R. Wagner. Demy 8vo. Pp. xxi + 323. Paris: Librairie Félix Alcan, 1918. *Price 3 fr. 85 c.*

Deuxième Expédition Antarctique Française (1908-1910). *Commandée par le Dr. Jean Charcot.* Documents Scientifiques. Ouvrage publié sous les auspices du Ministère de l'Instruction publique, sous la direction de Professeur L. Joubin. Paris: Masson et Cie, 1917. *Price 30 fr.*

Frozen Muck in the Klondike District, Yukon Territory, Canada. By J. B. Tyrrell, F.R.S.C. From the Transactions of the Royal Society of Canada. Vol. xi. Ottawa, 1917.

Department of Commerce. U.S. Coast and Geodetic Survey. Cartography. The Lambert Conformal Conic Projection, with two standard Parallels.. By Charles D. Deetz. Special Publication, No. 47. Washington, 1917. *Price* 75 *cents.*

Les Petites Hellades et l'Hellénisme. By Sotiris Skipis. Conférence donnée pour la Société de Géographie de Marseille à la Faculté des Sciences. Marseille, 1918.

El Cuerpo de Ingenieros de Minas y Aquas. With Map and Photographs. Lima, 1917.

Annuaire International de Statistique Agricole, 1915 *et* 1916. Rome: Imprimerie de l'Institut International d'Agriculture.

Report of the Director of the National Park Service to the Secretary of the Interior for the Fiscal Year ended June 30, 1917. Washington, 1917.

Report on the Administration of the Civil and Military Station of Bangalore for 1916-17. By the Hon. Mr. H. V. Cobb, C.S.I., C.I.E., Resident in Mysore. Bangalore: Printed at the Mysore Residency Press, 1916. *Price 9d.*

Report on the Administration of Burma for the Year 1916-1917. Rangoon: Office of the Superintendent, Government Printing, Burma, 1917.

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

NEW MAPS.

EUROPE.

ORDNANCE SURVEY OF SCOTLAND.—Publications issued from 1st October to 31st December 1917:—

Six-inch and larger scale maps. 1 : 2500 Scale Maps (revised), with houses stippled and with areas. Price 3s. each.

Linlithgowshire.—Sheet n 5—9.

Stirlingshire.—Sheets n 9—13. n 10—16. n 16—1, 2, 4. n 17—1, 2. n 22—1, 4, 5, 6, 10, 11, 12. n 23—3, 12, 13. n 28—13. n 30—9.

Stirlingshire.—Sheets 9—12. 10—10. Price 1s. 6d. each.

Note.—There are no coloured editions of these Sheets, and the unrevised impressions have been withdrawn from sale.

ADMIRALTY CHART, SCOTLAND.

The River Tay.—New Edition, 1918. No. 1481. Price 3s.

Admiralty Office, London.

BARTHOLOMEW'S HALF-INCH TO MILE MAP OF ENGLAND.

Sheet 6. Harrogate. Orographical colouring and Roads. New Edition, 1918. Price 2s. 6d. net., mounted on cloth.

John Bartholomew and Co., Edinburgh.

RACES OF EASTERN EUROPE.—*Daily Telegraph* War Map, No. 25. Scale 35 miles to an inch. By Alexander Gross, F.R.G.S. 1918. Price 4s. 6d. net.

"*Geographia*," *Ltd., London.*

This is a large-scale ethnographic map effectively coloured to show the various races of Eastern Europe in relation to the present international frontiers.

L'EUROPE ETHNIQUE ET LINGUISTIC.—Atlas descriptif en trois Cartes spéciales à couleurs, avec Texte démonstratif. A. Dardano, redacteur et dessinateur. 1917. Prix 5 fr.

1. Carte Ethnique et Linguistic de l'Europe. Échelle 1 : 10,000,000.
2. Carte Ethnique et Linguistic de l'Europe Centrale. Échelle 1 : 3,000,000.
3. Carte Ethnique et Linguistic de l'Orient Européen. Échelle 1 : 3,000,000.

Institut Géographique de Agostini, Novara.

This is an admirable piece of work. The maps are beautifully executed in careful detail, and the descriptive text gives an excellent summary of the historical evolution of the various races.

ASIA.

SYRIA.—Scale 1 : 250,000 or about 4 miles to an inch. 1917.

Jerusalem (Kuds-esh-Sherif) **Sheet.** Price 2s. 6d. net.

Jaffa to Damascus Sheet. Price 2s. 6d. net.

Geographical Section, General Staff, London.

These are clear and detailed maps which will be valuable in following the progress of the Palestine Campaign.

PALESTINE, SYRIA, AND THE SINAI PENINSULA.—Philips' Strategical Map. Scale 1 : 750,000 or 12 miles to an inch. 1918. Price 2s. 6d. net.

George Philip and Son, Ltd., London.

This is a general political map of the countries named, coloured to show the Turkish Vilayets. It includes the Syrian Desert as far as the Euphrates.

INDIA, INTERNATIONAL MAP.—Scale 1 : 1,000,000 or 15·78 miles to an inch. 1916. With orographical colouring and roads in red. Price 1 rupee each sheet.

Godavari Sheet, N.E. 44. **Madras Sheet,** N.D. 44.

Survey of India Office, Calcutta.

INDIAN GOVERNMENT SURVEYS.

Railway, Canal, and Road Map of India, 1916. Scale 1 : 2,027,520 or 32 miles to an inch. Political colouring. In 6 sheets. Price 12 rupees, coloured.

Rainfall. - Another edition of above map is issued with contours showing average annual rainfall in inches.

Provincial Maps.

Punjab (with hills). 1915. 1 : 2,027,520. Price 1 rupee 4 annas.

Bihar and Orissa (without hills). 1917. Scale 1 : 1,000,000. Price 1 rupee 12 annas.

India and Adjacent Countries Series.—Scale 1 : 1,000,000, or 15·78 miles to an inch. 1916. Price 1 rupee each sheet.

Sheet 10, Persia and Arabia :	(1) layered and shaded ;		(2) Political and hills.	
,, 17, 24, Persia	(1)	do.	(2)	do.
,, 25, Persia and Arabia	(1)	do.		—
,, 29, 33, Afghanistan	(1)	do.	(2)	do.
,, 39, Punjab, etc.	(1)	do.	(2)	do.
,, 41, Bombay, etc.	(1)	do.	(2)	do.
,, 43, N.W. Provs., etc.	(1)	do.	(2)	do.

Sheet 52, Kashmir, etc.	(1) layered and shaded ;		(2) Political and hills.	
„ 53, Punjab, etc.	(1)	do.	(2)	do.
„ 56, Hyderabad, etc.	(1)	do.	(2)	do.
„ 58-49, Madras, Mysore	(1)	do.	(2)	do.
„ 62, Tibet, Nepal, etc.	(1)	do.	(2)	do.
„ 63, United Provs., etc.	(1)	do.	(2)	do.
„ 64, Central Provs., etc.	(1)	do.	(2)	do.

Quarter-Inch Survey Map of India.—Degree Sheets. Scale 1 : 253,440 or 4 miles to an inch. Revised 1915-16. Price 1 rupee each sheet, or with boundaries coloured, 1 rupee 2 annas.

Afghanistan and NW. Frontier Province. Sheet 38.N, layered and shaded issue, also political, with hills.

Punjab, etc. 43.C, 43.D, also layered issue. Provisional Issues, with political colouring only, 39.L, 39.P, 44.F, 53.A, 53.E, 53.F, 53.I.

Kashmir and Jammu. Provisional Issues, with political colouring only, 43.M, 52.A, 52.A, 52.B, 52.C, 52.D.

United Provinces. Provisional Issue, with political colouring, 53.J.

Madras. Provisional Issues, with political colouring only, 58.J, 58.K, 58.N, 58.O.

Central Provinces, etc. Provisional Issues, with political colouring only, 64.B, 64.C, 64.F, 64.G, 64.H, 64.J, 64.K, 64.L, 65.E, 65.F, 65.I, 65.J.

Burma. Layered and shaded, also political, with hills. Sheets 84.L, 92.H.

Half-inch Survey Map of India.—Scale 1 : 126,720, or 2 miles to an inch. 1916. Price 1 rupee each sheet, or with boundaries coloured, 1 rupee 2 annas.

Punjab and NW. Frontier Province, Sheets—43.B-S.E., 43.B-S.W., 43.C-S.E, 53.B-S.E., 53.H-N.W., 53.H-S.E.

Hyderabad, etc., Sheets—47.M-N.W., 47.M-N.E., 47.M-S.E., 56.A-S.W.

Madras, etc., Sheets—49.M-N.E., 49.N-N.E., 58.A-S.W., 58.A-N.W., 58.A-N.E.

Central Provinces, etc., Sheets—55.M-S.E., 73.B-S.W.

Burma, Sheets—92.G-S.E., 92.H-S.E., 92.H-S.W., 92.H-N.W.

Survey of India Office, Calcutta.

GENERAL.

SOUTHERN HEMISPHERE.—Reproductions of Bellingshausen's Charts, with six large-scale maps of his Antarctic Discoveries in the years 1819-20-21.

Presented by General Jules de Schokalsky, Petrograd.

The reproduction of these charts is an interesting celebration of the hundredth anniversary of the Russian Admiral Bellingshausen's Expedition to the Antarctic.

ATLANTA DELLA GUERRA MONDIALE.—Pubblicato sotto gli auspici dello Istituto Italo-Britannico, Milano. 1917. Prezzo L.2.50.

Istituto Geografico de Agostini, Novara.

A useful series of 15 maps, giving the general aspects of the various battle areas over the world.

THE WORLD'S BATTLE FRONTS AT A GLANCE.—A series of thirty-two reference maps illustrating all the spheres of fighting. With Notes. 1918. Price 1s. 3d. net.

George Philip and Son, Ltd., London.

This little atlas comprises a great deal of varied and interesting information in a small compass. It is a most useful general summary of all the fields of the World's War.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

INDUSTRIAL POSSIBILITIES OF THE FORTH ESTUARY.[1]

By H. M. Cadell of Grange, B.Sc., V.D., D.L.

(With Maps.)

Foreshore Reclamation.—This matter has already been discussed at some length in my book *The Story of the Forth*, but the Great War has intervened since it was published in 1913, and many things have been changed in this eventful period. My proposals brought forward at various times were generally approved by the Coast Erosion Commissioners in 1911. The Development Commissioners also looked with a favourable eye on the scheme, and were preparing to do something practical when the catastrophe put an end to all hopes of immediate action. But now it is more necessary than ever to look ahead and provide for the useful employment of regiments of returned heroes and the rebuilding of the national fabric, and to bring before the public all ideas and plans calculated to promote these objects.

I have referred to the large amount of sediment suspended in the water, and to the injury and expense it causes to the harbours and shipping interests. Now if much of the mud can be abstracted from the sea and converted into fertile land or sites for industrial works along the sea margin; if much costly dredging can be obviated and the Estuary greatly clarified; if navigation can at the same time be improved and new industries introduced without undue expenditure, then the whole community will have good cause to bless the idea of a beneficent Conservancy that can do all or even some of these excellent things for it. This would mean a public board not out for dividends, but one whose revenues would be all devoted to the repayment of capital outlay, and the further extension of its usefulness.

[1] Continued from p. 189.

The subject is much too large for a paper such as this, but a few general outlines may now be sketched of some points worth considering.

Between Bo'ness and Grangemouth the sloblands extend to over 2000 acres, and above Grangemouth to over 800 acres. The greater part of this tract of foreshore is only covered by six to ten feet of water at ordinary high tide, some of it is already above the level of high-water of neap tides, and a small part of it has been reclaimed long ago and converted into good agricultural and industrial land. The rest can probably be reclaimed with advantage in the near future.

On the opposite shore, the slobland of Torry Bay, between Crombie Point and Longannet Point—a distance of five miles—with an area of some 1600 acres, might also in time be wholly or partly reclaimed by the same process, but I do not suggest that any attempt be made to produce so much new land all at once. To do so would, in fact, be a profound mistake. One section at a time should be experimented upon, and the rest could follow if the first trial met with unqualified success.

In the area above Grangemouth there is a deep bay without any important streams crossing it, and the whole of this slobland belongs to the Crown, which is an advantage, as there are here no complicated private proprietary interests to consider. A short distance from the shore there are various large "bings" of colliery refuse and stone that can, no doubt, be got for the lifting, or the removal, as the rubbish comes from the pit. At present they only spoil acres of good agricultural land, and to clear them away would be a benefit from the food production point of view. These excrescences on the landscape could therefore be advantageously used for making the bulk of the sea embankments round the proposed intake.

To begin with, the best way would probably be to run out a low bank near low-tide level round the intake, over which and through which the muddy water could flow for a time so as to "warp" or silt up the lower part of the lagoon until the surface rose to the level of high-water of neap tides. Mud dredged from the neighbouring harbours of Grangemouth and Alloa or from the adjacent shallow fairway of the Forth could by means of hopper barges with shallow draught also be deposited in the intake until it became too shallow for them to enter. At present this mud is nearly all laboriously taken down at ebb tide in large hopper dredgers or in barges to Queensferry, a distance from Grangemouth of eleven miles, and from Bo'ness of eight miles, where it is dropped into the deep water, generally at low tide, and, no doubt, as the flood sets in a great deal of it follows the mud boats on their slow voyage home. This absurd system has been going on for the last twenty or thirty years for want of a better way or a more useful place to deposit the dredgings. By providing a convenient "free toom" or dumping-ground close to the place that is being dredged, the dredgers could do double the work at far less expense, and not add more mud to the Estuary at another place, while incidentally they would assist in making more good land where it is needed in the vicinity of the harbours.

Agricultural Reclamation.—After the level of the warped mud has

risen to high-water of neap tides another and a watertight embankment must be made on the top of the first to exclude the tide altogether. The total height of the two banks in the bay above Grangemouth would not be more than fourteen feet on the seaward face, since the outer bank would begin where the foreshore is several feet above low-tide level. All the land thus reclaimed would be four or five feet below the level of high-water at spring tides, like the reclaimed land in Holland. Indeed some parts of the anciently reclaimed carse of Kinneil west of Bo'ness are already under high-tide level, and are actually below the level of the mud outside, which has gradually risen since the old sea dyke that encloses it was constructed. These low-lying fields are drained by tidal sluices that are automatically closed when the water outside is above their level, but for a deeper reclamation, windmill or motor pumps might be necessary to provide for complete drainage of the intake.

Land reclaimed in this way takes, of course, several years to make, and is only of use for agriculture. It must thus be economically produced, but I believe from calculations I have made that the cost, if the intake were large enough in proportion to the length of the embankment, would not exceed £40 or £50 per acre. If £2, 10s. per acre of rent could be obtained—and some reclaimed fields at Dunmore below Alloa are let for £3—there would be a gross return of five or six per cent. on the outlay. This is, perhaps, not much to look forward to after several years of work and outlay, but it is a solid and permanent return, and the country would benefit by thus increasing its food producing area, and by obtaining an additional outlet for much useful employment. Land of this kind should produce heavy crops for several years with very little manure.

Industrial Reclamation.—But the surface of the land that is to be used for industrial works must all be raised well above sea-level, and is thus more costly to reclaim. After the mud has risen to within six feet of high-tide level the surface must be filled up to the necessary height. The dredgings can still be used to raise it, but must be lifted and thrown over the bank by suction pumps or elevators of some sort worked by engine-power. Each acre, reckoning the cost of levelling it up at no more than sixpence per cubic yard, if it had only to be raised two yards, would cost for this item alone £242, so that it is clear the new land could not be made for less than £300 per acre at the very lowest computation, and possibly it would cost considerably more than this. But then land of this class could quite well be let or feued for £30 or £40 per acre or more for shipbuilding or other more remunerative and concentrated work than agriculture, and a return of ten per cent. might be reasonably expected.

I speak from experience, as I have followed this plan and have been able to fill up the last fathom of my warped land for less than sixpence per cubic yard with rubbish supplied free by the railway company, when large daily supplies of slag, ashes, etc., had to be got rid of some years ago, but that chance does not occur often, and cannot be counted on in all cases. One circumstance, however, was favourable to the plan, and is worthy of mention here. When the imports to Bo'ness

Harbour sometimes exceeded the exports, empty trucks must needs be sent down for cargoes being discharged, or for local coal being sent inland, and the trucks of rubbish from a distance, which would otherwise have been run down light, came like ships in ballast to be emptied and returned with a more remunerative cargo. This was a small item of railway economy, no doubt, but it paid both parties, and under economic management might again prove feasible.

Operations of this kind take time to develop, and must be extended over several years before they can be expected to bear full fruit. Industrial land can, of course, be reclaimed quickly by simply dumping down heavy rubbish on the foreshore, but the depth to be filled up is much greater if the assistance of the sea silt is not taken advantage of. The tide has a rise and fall of eighteen feet in the Estuary, and nineteen feet at occasional springs, and to fill up much of the foreshore in this way, except along the beach where it is shallow, would prove a ruinously costly proceeding if attempted on a large scale.

Clarifying of the Water.—On the assumption that most of the silt is not derived from the river water at all, but comes mainly from the existing mud banks, it is evident that if the larger tracts of foreshore are reclaimed by warping inside artificial lagoons, the greater part of the suspended mud will be precipitated there, and the Firth of Forth will once more become clear and transparent, as it seems to have been in the times of the Romans, when large oyster beds flourished above Kinneil. In this event, the only mud remaining in suspension will be that small quantity which comes down the river at times of flood and is washed in at Queensferry, and two important results will follow :—

1. The warping will cease or become very slow for want of material, and further reclamation by this means will be automatically stopped.
2. Dredging will be greatly diminished, or will not be longer required when there is no more silt to dredge.

The first consequence should lead to caution in considering the size of the intake. If, with nothing but reclamation in view, all the available foreshores were embanked at once, the suspended mud might be all used up, leaving too little to settle inside and raise the level adequately. And again, if the mud is due to the scouring of the exposed foreshores by the waves, the surrounding embankments would henceforth protect them from further wave-action, so that there would soon be nothing for the sea to attack, and the water would become quite free from sediment from that source. This is, however, a matter that cannot be definitely settled except by experiment on a large scale. It is certainly very desirable to clarify the Forth as far as possible, and obviate the nuisance and loss due to the mud, and if this can be done, in combination with foreshore reclamation, much ultimate benefit will accrue to all concerned.

Caution required.—For these reasons it may be concluded that, while reclamation by warping may be an eminently satisfactory method of gaining a few *hundred* acres of land in the Forth Estuary, it may not be so successful for areas of a few *thousand* acres, and therefore a

cautious policy must be adopted. We must, however, bear in mind that it will never be feasible to reclaim all the foreshores above Queensferry but only the broadest parts of them. The total area of unreclaimed foreshore between the Bridge and Kincardine Ferry before Rosyth operations began was about 8500 acres, and of this probably not more than half is capable of profitable reclamation.

Effect of Reclamation on the Tides.—Another and weighty reason against attempting too large an intake is the possible local effect it might have in raising the height of the tides. If the channel became too constricted, the tidal-wave entering the trumpet-shaped Estuary might be heaped up in proportion as the fairway was narrowed, and it goes without saying that an additional rise of even a foot to the highest spring tides would do immense damage to the low-lying towns and land along the upper reaches of the Firth. Exceptionally high tides occur occasionally after the prevalence of certain high winds. I well remember an abnormally high tide some years ago that spouted up through the manholes in the sewers of Bo'ness, covered some of the streets, overflowed the dry reclaimed land at Bridgeness Colliery, and poured for half an hour down the main shaft in a grand cascade. When there is already so small a margin of safety we cannot afford to reduce it still further. But so far the ground that has been reclaimed from the sea during the last half century—probably between 500 and 600 acres in all—has made no appreciable difference in the tidal wave, and there is ample room for further work before the limit of safety is approached.

Dredging.—The mud that has been dredged has all hitherto been dropped into the Firth. It is supposed to have been deposited at or near the Bridge, either outside of it or in to the deep hole between Beamer rock and Inchgarvie. Now a comparison of the Admiralty charts with soundings taken in 1851 and 1898 respectively shows that in spite of all these forty-seven years of filling up, it remained exactly 41 fathoms deep all that time. The current at the Bridge runs at four miles an hour—a speed far more than sufficient to move even fairly heavy sediment—and it is thus clear that all the light mud dropped in had been swept out again by 1898. Since the great dredging operations at Rosyth began in more recent years far more mud has been deposited in that handy receptacle no doubt, but it seems quite probable that a large part, if not all of it, will be washed out in time. Part of it, doubtless, will be swept out to sea by the ebb tide, but perhaps as much may be swept up the Estuary by the flood, and will have all to be excavated again from the entrances of the various harbours in years to come.

What is required in the circumstances is to provide one or more enclosed areas of foreshore as receptacles for the dredgings, which will prevent the possibility of their being returned to the water from whence they came, and obviate the necessity of doing the same costly and dismal task all over again in future years. Land reclamation from this point of view alone is well worth consideration in connection with other plans for general post war economy.

Undersea Coalfields.—There is another aspect of the foreshore reclamation question that should also be considered. Under the foreshores at Kinneil and at Torry Bay there is an extensive coalfield to be opened up. At Bo'ness the lower seams are being already worked under the foreshore and sea-bed from deep pits on the shore, but immediately to the west of Bo'ness harbour the upper seams, of which there are several, crop out close to the surface of the mud, and cannot thus be safely worked. By converting the foreshore into dry land, shallower pits could be sunk to the west of the harbour from which the upper seams of coal and ironstone could be mined quite easily.

On the opposite shore at Torry Bay the same thing could be done on a larger scale. Preston Island in the centre of the bay is a reef of sandstone rising through the mud, which extends out to low-water mark a mile from the shore, and is only an island at high tide. Coal was unsuccessfully mined here in 1805 by Sir Robert Preston of Valleyfield, who sunk three pits and £36,000 of good money in them.

There are here no less than six workable seams, some of them of excellent quality, from 2 to 6 feet in thickness, with 18½ feet of solid coal in them, and another thick but inferior seam, the Janet Peat Coal, occurs in the bay to the west of the island. These seams, which have a steep dip at the island, cannot be safely worked where the outcrop is exposed to the sea, but if the sea were shut out by an embankment a good coalfield of over 1000 acres would be made available, only a small part of which was worked long ago by primitive methods. This area is all or mainly under the control of the Fife Coal Company, which has two large pits at Low Valleyfield, where the coal under the landward part of the field has lately been opened up on an extensive scale.

If this part of the foreshore were reclaimed by a sea wall, the rubbish from these collieries and stone from the old quarries at Blair to the west of Culross could well be used.

At Bridgeness a seam of coal lying close to the surface is now being worked from the outcrop under the mud inside the reclaimed foreshore, which was quite unworkable until the tide was excluded a few years ago.

The Improvement of the Channel.—The whole channel from Bo'ness to Alloa badly requires dredging. Opposite Bo'ness for nearly a mile out the depth at low tide is less than a fathom. The deepest part of the channel is along the north side, where it sinks to nine fathoms, and it would be obviously very advantageous if the deep fairway could be brought nearer the main course of navigation.

The bed of the Firth at Bo'ness is occupied by the Dods Bank, on which at low tide there is only half a fathom of water, and at extreme low tides parts of it are bare for a long distance out. Some or all of these banks were produced by ballast thrown out by generations of ships before the ancient and very objectionable practice was stopped by the Admiralty about half a century ago. There has been no appreciable shallowing of the channel here since 1851, and this proves that the tidal scour is quite sufficient to keep it clear. Opposite Grangemouth the deepest part of the channel is barely two fathoms at low tide, and at

Alloa one fathom in depth. If it were deepened all the way from Alloa to Bridgeness, and a proper trough excavated, the current would no doubt keep it clear, and further dredging would be obviated. The effect of low training walls of rubble along the low-water line on either side between Bo'ness, Grangemouth, and Kincardine Ferry on the south shore, and from Longannet Point to Preston Island and Crombie Point on the north, would be to guide the main current into a well-defined channel, as well as to assist in the reclamation of the foreshores behind in the manner I have already described.

River Avon.—Where there are only small streams crossing a foreshore, which can be run into pipes with tidal flap valves at their mouth, the reclamation of the ground is not much affected, but where there is a river of any size, it must be enclosed on each side by watertight embankments that add to the cost of the intake. The River Avon to the west of Bo'ness would require to be treated in this way. If the bed of the river below high tide level were straightened by a new cut, such as is shown on the accompanying plan, two retaining banks, each about two miles long, would be required. Some parts of the river where it crosses low-lying parts of the carse of Kinneil have already been embanked to prevent flooding when both the river and the tide are high. But the mouth of the river thus improved might be used for wharfage for works along its banks, and there would be no danger of such a tidal harbour silting up, as the Avon does not bring down heavy sediment, and the stream would scour the channel regularly.

The river issues from a narrow glen or gorge, over 100 feet deep at its mouth, which is mainly excavated in the rock. It begins at Inveravon and runs for more than two miles inland towards Linlithgow. It would be possible to construct a dam across the glen above Inveravon, and impound the water to a depth sufficient for a working head of forty feet or more. A good local source of a limited amount of power could thus be provided. There is not much water in the Avon except in wet weather, but what water power there is goes mostly to waste, and might be made better use of and considered along with other plans for future economies.

Similar conditions occur in the Almond Valley, at the east side of the county, where the falls at Cramond and Craigiehall might, with modern methods, be used to better advantage, and made to produce far more power than is developed from them at present. The Almond has more water than the Avon, and has a fall of 100 feet within little more than a mile from its mouth at Cramond. When coal becomes dearer, the water-wheels or their modernised equivalents on these rivers may come into their own again, and necessity will have to be the mother of many more new inventions for resuscitating local branches of rural industry at such places.

The Union Canal as a Source of Power.—In this connection, although it is more remote from the Forth Valley proper, it seems to me some use as a source of power at a few places along its course might be made of the old Union Canal, that runs along the 240 feet contour from Edinburgh to Falkirk. The Canal, which belongs to the North British

Railway Company, has long been practically disused as an inland trade route. It is lying almost idle, and is for the most part stagnant and rather malodorous. It crosses the Water of Leith at Slateford, the Almond at Clifton Hall above Ratho, and the Avon at Woodcockdale above Linlithgow Bridge and Manuel. Now at each of these places, and also at Linlithgow, there is either a high aqueduct or a steep bank below the water, where a working head of 50 to 80 feet could probably be obtained if the canal were used for power purposes. But to use it thus much more water would be needed. This could be obtained by turning into it some of the numerous burns that rise on higher ground and cross it in pipes or underground culverts. These could be easily intercepted at higher levels, and as the power could only be drawn off at the places where it crosses the valleys, the spent water taken from the tributaries of the respective three rivers would be all finally returned to their natural destinations. As the Canal is quite level, the water could not flow very far along it in any direction in large quantity. A feeder, say at Linlithgow, could not, for example, be of much use to a power station at Slateford, but within a certain radius from each feeder some power could be obtained, no doubt, and used for lighting and other things. As the burns are low in summer their contribution of power would be mainly confined to the wet months of the year.

The Canal, it may be mentioned, was completed in 1822. The estimated cost was £235,000, and the estimated revenue £55,000 per annum, but before it could be used the cost had risen to £600,000, and during the first seven years the annual revenue fell short of £17,000, equal to only $2\frac{3}{4}$ per cent. on the outlay. When the Edinburgh and Glasgow Railway was opened soon afterwards, this small profit disappeared entirely, leaving another notable example of well-meant but misdirected work and wasted money. The Canal is fed by a conduit from a dam on the Almond near Mid Calder, and if it were to be utilised for power more of the river water might easily be diverted into it at this place without appreciable injury to riparian interests. The Cobbinshaw reservoir was made to compensate for the water thus taken from the Almond. But as there is no longer any use for the locks at Camelon, the quantity of water required for the Canal is negligible, and the original supply provided for could all be utilised for power without affecting any interests at all. The highest aqueduct, at Woodcockdale, crosses the Avon at a height of 85 feet, and the next highest, at Clifton Hall, is 79 feet above the Almond.

This is merely a passing suggestion for the better use of an existing valuable but idle structure—a reservoir and an aqueduct combined, capable within its limits of being perhaps made of more service to its riparian community than it has been for the last eighty years. The use of the Canal in this way would not necessarily destroy it as a waterway for traffic. The currents would be too feeble to be appreciably felt by barges. Indeed, the movement of the water would in the course of time cause an important improvement in its condition. The Canal would cease to be stagnant, and might be stocked with fish to help the food supply. Pike and perch are the only fish that inhabit it at present, and

the addition of trout would provide much better sport. It might also be used in teaching the neighbouring children how to swim—a highly important branch of education that is sadly neglected in most inland districts.

The Plan.—The developments suggested can only be understood by reference to the map, and the accompanying plan illustrates these and some further proposals that might be useful as part of a general scheme of operations. If an embankment were run from the mouth of Bo'ness Harbour to the outer end of Grangemouth Dockyard, a distance of three miles exactly, it would enclose an area of roughly 1960 acres, and would include all the foreshore that can be usefully reclaimed between these two ports. The higher part of the intake next the shore being already very shallow could be shut off by an inner embankment at once and devoted to agriculture. This smaller bank, if it were made, say, half a mile from the outer and larger sea-wall, would run nearly along the centre of the intake, and might cut off, say, 1000 acres, leaving 960 acres outside. A railway from Grangemouth to Bo'ness, three miles in length, might be laid on this central embankment, the cost of which should be paid by the railway company, since the branch line would feed the traffic on the main system and pay its own way if the adjoining ground were developed for industry. A bridge over the Avon must be provided, but as there would be nothing but the river passing under it, neither the height nor cost would be considerable.

The outer part of the foreshore, which is deeper, would naturally be devoted to sites for industrial operations—shipyards, tidal wharves, dry-docks, etc.—and would need to be reclaimed by degrees. A low embankment, 3 miles long and, say, 6 feet high, made of heavy rubbish, might first be run along the outer line, and the space between this bank and the proposed railway filled up by warping, and by the mud and gravel dredged from the harbours and the main channel outside. At the mouth of the Avon there are wide tracts of gravel along the low water-line which would provide a solid foundation for most of the bank. The reclamation of the whole 960 acres would take several years to complete, no doubt, but the filling up by dredgings might begin at one end, and be completed in sections. Two narrower embankments, each two miles long, enclosing the straightened Avon mouth, would also be required. These would cut the area into two parts, and the section next Bo'ness being the smaller might be filled up first, and made available for works within a few years. The Grange Burn, which at present runs seawards along the east side of Grangemouth Docks in a deep channel in the mud, could be partly diverted at a higher level, so that all its flood-water would run into the Avon near Jinkabout. A large pipe for a main outfall sewer could be laid seawards in the present channel along the dock boundary to carry off the drainage of the district, and only enough water from the burn allowed to pass to flush it out adequately. The cost of this outfall sewer might well be in whole or part defrayed by the Local Authorities that would benefit by it. The Avon channel would carry off all the drainage of the agricultural part of the reclamation further east.

This ground, being stiff clay-land, could only be economically cultivated by means of moderate-sized farms, and would never do for gardens or small holdings. Five farms of, say, 200 acres each could thus be provided, and being alongside the railway would have all the advantage of such a situation.

A large water-pipe was laid a few years ago along the road from Bo'ness to Jinkabout and Polmont, by which Bo'ness can obtain an excellent auxiliary supply derived from the large Grangemouth reservoir near the Gillies Hill at Bannockburn. This pipe could be made available for supplying the farms and works on the proposed reclamation, so that one part of the problem at least has been solved in advance in pre-war times.

If the outer or industrial zone were thus developed the clay soil would not be a desirable site for dwellings, but only for works, and there might be a tramway to convey the inhabitants to a residential area on the higher ground west of Kinneil, where there are excellent sites overlooking the Carse. The tramway might be worked by electric power obtained from the Avon, as suggested above, when there was enough water in it, or the new railway could be used for passengers living in Bo'ness or Grangemouth. A direct railway connection from Bo'ness to Grangemouth and Larbert would be an advantage in any case, and if the line could be laid in such a way as to help the general scheme of land development so much the better for all parties. The line might in time be extended eastwards along the shore past Carriden and on to the high ground at Blackness, without injuring the amenity of the beach in that district, and either joined to the North British Railway near Philpstoun or run round above the beach to Port Edgar.

The foreshore above Grangemouth would probably make a better agricultural than an industrial area, and for another reason, to which I shall shortly refer, it would probably be preferable to do nothing further than reclaim it by warping in the meantime.

As to the opposite coast, which might also be reclaimed in time, it will be observed from the map that the chord of the arc from Longannet Point to Crombie, which is 5½ miles long, is bisected by the reef of rock known as Craigmore, extending for half a mile south-westwards from Preston Island to low-water mark. Now it would be a large undertaking to reclaim all this bay, and indeed if the foreshores at other places were taken in as suggested it might be necessary to give up all idea of still further restricting the tidal area of the Estuary. But should the reclamation of Torry Bay ever become feasible, the best thing to do would be to begin with the western half. An embankment could be run out from the shore to the island with rubbish from the colliery at Low Valleyfield, and extended southwards along Craigmore to low-water mark. Another embankment or training wall for the river could be run along the line sketched past the Hen and Chickens Bank to meet Craigmore, and the half of the bay enclosed after the mud had silted up inside the outer wall. One advantage of this plan would be that as all the important coal seams lie under the foreshore west of the island the reclamation of this section first would enable them to be safely worked.

MAP ILLUSTRATING
SUGGESTED INDUSTRIAL
DEVELOPMENT OF FORTH ESTUARY
H. M. Cadell 1918
Scale of Miles
0 ¼ ½ ¾ 1 2
KINCARDINE Ferry
100 ft Contour
Edge of High Ground
Colliery
LOW VALLEYFIELD
CULROSS
Torry Bay
TORRYBURN
Longannet Pt
Muddy Foreshore
Suggested training Wall
Preston I.
Old Colliery
Craigmore Reefs
Hen & Chicken Bank
L.W.M.
H.W.M.
Crombie
Crombie Pt
Foreshore suited for Agricultural Reclamation
Mouth of Carron
Mouth of Grange Burn
Old Collieries
Dock
Suggested Outer Bank
Mouth of R. Avon when straightened
CHARLESTOWN
Industrial
Suggested Inner Bank
Agricultural
1000 Acres
Zone
3 miles
Boness Harbour & Dock
Bridgeness Harbour
Reclamation of foreshore in progress
Suggested Ferry
Carron R.
GRANGEMOUTH
CARSE OF FALKIRK
BONESS
Collieries
Low Water Mark
Sandy Foreshore
Old Sea Dyke
CARSE OF KINNEIL
Old Reclamation
KINNEIL
Carriden Ho
Castle
BLACKNESS
Grange Burn
Suggested diversion of burn
Jinkabout
INVERAVON
Suggested Residential Area
Airngath Hill 550 ft
Grange
100 ft Contour
Carse of the Avon
Edge of High Ground
POLMONT
150 ft
Loch
N.B.RY
Union Canal
LINLITHGOW
Philpstoun Sta
Union Canal 240 ft
R. Avon
Aqueduct
WOODCOCKDALE
Recently reclaimed Foreshore
Unreclaimed "
Suggested Industrial Reclamation
Suggested Agricultural "

This is, of course, only a consideration for the distant future, but at present a rubble training wall from Longannet Point to Craigmore might be useful in helping to direct the current so as to let it scour out a regular channel which would be of use to navigation in the meantime, and incidentally it would promote the warping up of the foreshore behind it.

The Proposed Ship Canal.—Some reference to this much discussed proposal will doubtless be expected here. Of course, if the deep-water canal to the Clyde is ever made it will profoundly modify most of the plans that are here suggested. To begin with, the material excavated will require a sufficiently large dumping-ground at each end, and perhaps this aspect of the subject has not been sufficiently considered by the promoters. The material to be excavated in the direct route canal is estimated by Messrs. Armstrong, Whitworth & Co. at 253,000,000 cubic yards. If we were to take the half of this vast accumulation of spoil, or, say, 125,000,000, derived from the eastern half of the excavation only, and deposit it on all the foreshores above Bo'ness and in Torry Bay, which have together a reclaimable area of, say, 4400 acres, there would be enough material to cover the whole to a depth of about 18 feet, more than twice as deep as would be of any practical value. Indeed, if the foreshores west of Bo'ness were raised to this height the existing carse land outside high-water mark would become a relative depression, whose drainage would be rendered very difficult.

Without some convenient outlet for the spoil the cost of the canal would of course be greatly increased. I refer to the direct route along the Bonny and Kelvin valley which is favoured by Glasgow. The spoil could not be distributed along the high banks on this route without incurring great expense, as it would for the most part have to be lifted up more than 100 feet, at this end of the canal at all events, and even if it were so disposed of, much adjacent agricultural land would be ruined for years by being buried under such quantities of unproductive rubbish. It must thus be removed mainly in barges; but there is no room for it in the bed of the Firth above Queensferry, and if it were not deposited on the foreshores it would require to be taken outside the Bridge and dropped into deep water. When the maximum of food production is required by the country the extent of land that would be taken from agriculture for the canal waterway itself, and the belt of land between the wide slopes which its banks would require, would, apart from the ground used for dumping the spoil, reduce the food-producing area of the district materially. That is, however, a minor objection, suggested only from the farmers' point of view.

The mouth of the canal, whichever route is adopted, would have to be above Grangemouth, and in the present condition of the Estuary constant and expensive dredging would be necessary to keep it clear. The channel outside, as far down as Bo'ness, would require to be dredged also if a depth of 5 fathoms at low tide were to be maintained. If, for the sake of saving expense, all the foreshores were to be reclaimed with the spoil, the land so produced would be mainly made up of gravel, sand, and stones of poor agricultural quality. The rich alluvial mud

would be all covered up, and thus land reclaimed in this way would be of little use except for industrial purposes, and far more would be produced than would be required for many years. The revenue from such land would thus be very small for a long time, unless there was a great extension of non-agricultural industry at this end of the canal.

The other aspect of the question, to which reference has already been made, again comes before us. We have seen that caution is essential in planning large intakes of the Estuary all at once, on the ground that the tidal wave might be raised if the channel were to be too much constricted, and the dumping down of millions of tons of rubbish in order to get rid of it cheaply on the reclaimable foreshores might be productive of great injury to the various riparian communities. This point may or may not be found important, but it is certainly worth considering among the other pros and cons of the question, and, in the meantime, for these reasons it is well to exclude the greater part of the foreshore area as a dumping-ground for all but a small fraction of the spoil that must be disposed of.

The scheme may have strategic advantages to commend it, but so far the Admiralty authorities appear rather doubtful on the point. Other advocates point to the great advantages to Rosyth of having an easy access to the Clyde shipyards. Had the canal been in existence before the war, no doubt these considerations would have had their weight. But as things are, would the latter point not be far better met by having new shipyards and dry docks established on the Forth to which the Rosyth fleet could safely resort in half an hour's time? The suggested 960 acres of reclaimable foreshore along low-water line between Bo'ness and Grangemouth would provide admirable sites for such establishments, where all the ships required in this part of the North Sea could be both cheaply built and repaired with the greatest speed and economy.

I have in the sequel an important suggestion to make as to the advantage of establishing in the Forth a new centre of the steel and shipbuilding industry. I shall say no more here about the vexed canal question, except that if a hundredth part of the proposed expenditure on an unremunerative speculation were devoted to the development of the Forth Estuary and the utilisation of its great natural resources, the return would not only justify the outlay but would in the end assuredly repay it a hundred times over.

There is, of course, always a remote possibility of the canal being made in the distant future although not in our time, and if it is ever dug its entrance will probably have to be above Grangemouth, whichever route be adopted. For this reason, my suggestion now is that the bay above the Carron mouth be not reclaimed meanwhile for industrial operations but only for agriculture. Should the ground be wanted for the canal, there will thus be no unnecessary expense in compensating the owners for giving up valuable sites for works, and all that will be payable will be the claims of the agricultural occupiers and of the Crown authorities to whom this tract of slobland belongs.

The development of the third or upper section of the valley beyond

the Estuary proper for greater industry is a subject for consideration in the more distant future. The navigation above Alloa is greatly hindered by the Caledonian Railway bridge and by the windings of the river. If the river were ever to be made available for much shipping the railway should be taken under the river, so as to avoid the present dangerous swing bridge, and the channel straightened by cutting two or three of the links. Three important collieries have been opened alongside the river near Stirling in recent years, and the improvement of the fairway might be a benefit to them; but it is doubtful if the advantage of these alterations would be sufficient to warrant the outlay. If the canal were ever made by Stirling there would be no need to consider the river, and in the meantime the further discussion of the matter seems premature.

New Industries.—Trading facilities are of no avail unless there is trade to use them, and what has already been suggested is of less importance than the question of promoting new branches of industry or the extension of existing trades and manufactures in the district. The oldest and most important business of all is agriculture, and provided prices are not allowed to fall to an unremunerative level again, farming will continue to be a profitable and thoroughly sound branch of business —one that is capable of much extension and improvement, and deserves all encouragement and help.

The reclamation schemes I have suggested will provide eventually for much more land than is likely to be needed for ordinary works and manufactures, and the greatest part of the newly made ground can only be used for farming purposes and food production.

The rich, reclaimed mud of the Forth would after a few years yield heavy crops, and this new land should let at £2 or more per acre. On that point there can be no dubiety, and from the farmer's point of view alone reclamations of the foreshores are well worth consideration. Two or three thousand additional acres of wheat land would be a national asset of much value at this time, and the obvious advantage of acquiring them cheaply does not need to be further emphasised here.

Iron and Steelmaking.—When the enterprising founders of the Scottish iron industry established the Carron Company, in 1759, they had in view the establishment of many other large ironworks round the shores of the Firth of Forth. Several blast furnaces and forges for malleable iron were afterwards established in Fife, the Devon Valley, at Bo'ness and Cramond, but long before the end of the nineteenth century the Carron Works alone survived in the Forth Valley. The native ironstone seams of the Carboniferous formation have become practically exhausted in the district, and it is now necessary to import foreign ore to keep the furnaces going. Most of the imported ore comes from Spain, and is mixed with what is still derived from a few Scottish mines. The largest ironworks and all the steelworks are now situated in the Clyde district, but there seems to be no good reason why steel should not be made in the east of Scotland also.

It is probably not yet generally known in this country that by far the largest iron ore deposits in Europe, and perhaps in the world, occur

in the Arctic circle in Lapland, at Kiirunavaara and Gellivaara, and belong to Sweden. The quantity of ore in these two places is estimated at over a thousand million tons, and indeed the supply is practically inexhaustible. The ore is magnetic oxide, very pure and rich in quality, with 60 to 70 per cent. of iron, but it is refractory to smelt, and contains a considerable percentage of phosphorus. Special furnaces and processes are therefore necessary to reduce it. It has only been extensively worked since 1902, and the greater part is shipped at Narvik, an ice-free port in the north of Norway, and most of it goes to Emden, where it is sent thence by rail to be smelted in the Ruhr mining district of Germany.

The Firth of Forth is a hundred miles nearer Narvik than Emden, and as there is abundance of coal here it is obvious we have considerable natural advantages over the Germans in this direction alone. The Forth is considerably nearer and more accessible to the Lapland mines than is the Clyde valley, it is to be also noted. The ore can be brought in to Grangemouth, perhaps, and taken, say, to Carron, which is a far shorter distance than from the port of Emden to the Ruhr. Special furnaces to deal with a large quantity might be constructed in that locality, and the basic process of iron- and steel-making introduced on a large scale. The basic slag from phosphatic ores is, moreover, a very valuable agricultural fertiliser—a by-product for which there is an unlimited demand. The Carron works being close to a large harbour, well organised and managed, and in a coal-mining and good industrial centre, are admirably adapted to be extended so as to make basic iron from the Lapland ore. The neighbourhood of Bo'ness also affords on the reclaimed land suitable sites for large steel works that might be laid out *de novo*. By the newest methods the ore goes into the smelters, and passes continuously through the different stages of the process practically without ever being allowed to cool, and comes out at the other end in the finished condition of rails, plates, wire, or in any other form that is required. To fit up a modern and continuous steel-making plant of this kind would, however, I am told, cost at least £500,000. But if the ore can be brought by sea to the very mouth of the furnaces with no railway charges and the smallest cost of handling, and if in the same way the works are situated so that the manufactured steel can be shipped for export with the minimum cost, or used locally for shipbuilding in the immediate vicinity, then it is obvious such a saving in the standing costs for freight that other works have to meet in less favoured places, will in the long run give the new establishment permanent advantages of a very important kind, and the necessary capital outlay would in the circumstances have every chance of being well rewarded in a short time.

Shipbuilding.—The suggested industrial zone next the sea above Bo'ness would provide excellent sites for shipbuilding, and there would be abundance of room in the channel for launching large vessels at high tide. By laying out the whole area with these things in view the greatest convenience and economy could be secured from the start, and there is absolutely nothing on the ground to interfere with or restrict the best plans that can be devised.

The advantage both to the Admiralty and to the shipping trade of the East Coast of being able to build and repair ships of all sizes within a sheltered arm of that part of the sea where they are most needed is self-evident. It is clear, from the national point of view, that the whole country would be the ultimate gainer by such a scheme as I now venture to suggest. This proposal does not, of course, prevent the most being made of existing facilities at Leith and other places, already adapted for large ocean-going steamers, which are also capable of extension. But alongside of purely industrial development, the proposal offers special scope for providing better social surroundings for the workers, a matter I have already referred to at the beginning of this paper.

Mineral Developments: Fireclay.—Reference has been made to the possibility of improving coal-mining under the foreshores west of Bo'ness and in Torry Bay. The only minerals that have been extensively mined here and worked for several centuries are coal and ironstone, but a large and valuable seam of fireclay has long been known to exist on Kinneil estate between the river Avon and the railway to Bo'ness. The fireclay has lately been opened up and mined, but is not manufactured in this district. The seam is about 40 feet thick and is divided into sections, some of which are of very high quality.

It occurs in the same geological position as the well-known seam at Castlecary and at Glenboig in Lanarkshire, where it has long been profitably mined and manufactured. The fireclay, instead of being only mined, might be both worked and manufactured in this district on an extensive scale. The seam no doubt extends northwards to the edge of the high ground above the carse at Inveravon, and the flat ground of the carse of Kinneil provides an excellent site for kilns and works near the railway and harbours. Firebricks of all sorts would be required for making furnaces for steelworks, and fireclay drainpipes made on the spot could be supplied to local customers or exported at the lowest price.

Limestone.—A few fathoms below the fireclay seam there is a good bed of limestone from 6 to 7 feet thick, the local representative of the Castlecary or Levenseat limestone, which has been extensively worked at other places, and might be opened up here for ironmaking, building, or agricultural purposes. These seams, being on the high ground above sea level, could be worked from the edge of the carse by day levels without any pumping for many years.

Extent of State Aid necessary.—To carry out these proposals a certain amount of State assistance would be required, and Parliamentary sanction to constitute a Forth Conservancy, with the necessary powers, must first be obtained. The aid of the Foreign Office to facilitate supplies of iron ore from Sweden might also be required, so that after the war Germany may not obtain the monopoly of that trade which she will very probably desire. The Development Commissioners might also with great advantage apply some of their funds to assist the initial outlay which these suggestions involve.

But beyond granting all needful facilities and giving general encouragement to industry and commercial enterprise, State interference should not go. Many voices are clamouring for State control of all

sorts of industry, but apparently only with the object of paying high wages and salaries to numerous officials, regardless of the profit and loss aspect of the question. With our appalling National Debt to liquidate, we must look further ahead than that, and plan not only to pay good wages but to earn good profits as well. Experience shows that both of these excellent things can be done far better by the initiative and enterprise of capable individuals and well-managed companies than by the best-intentioned of Government departments, whose work is nearly always associated with red tape, waste, and with the difficulty of getting rid of incompetent employees. Having been in the Civil Service myself, I can speak from experience of what I have seen. If the resources of the Forth are ever to be satisfactorily developed, this can only be done by the operation of unfettered individual enterprise of the same well-tried variety that has originated and promoted all our useful discoveries in the past, and has raised this country to the high position it holds in the world of invention and industry.

Conclusion.—To do all or even a few of the things that have been suggested would, of course, involve adequate financial support, and the approval and co-operation of many different people and interests. It is quite possible some of these ideas may meet with criticism, and may suggest a conflict of opinion. But the proposals are meant for discussion and amendment, and are far from being the last word that can be said on the subject. The ideas are mainly original, and no doubt other more and competent visionaries could add to them in various directions that their experience may indicate. But what is wanted now is not mere academic discussion. Some of the matters I have dealt with have already been discussed for years with no result, and now I take the opportunity to appeal for practical help and co-operation in a geographical and industrial piece of local reconstruction, the benefits of which must be quite apparent to every practical and patriotic mind.

In conclusion, and in the order of their relative importance, the main propositions may now be summarised :—

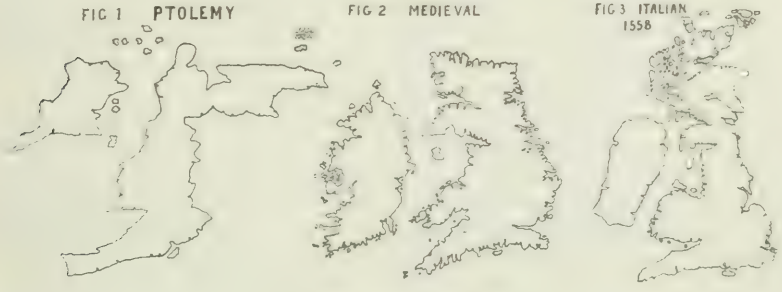
1. The establishment of a Forth Conservancy to dredge the channel, improve the navigation, reclaim the foreshores, and promote the general riparian industry of the Estuary.
2. The introduction of the manufacture of basic iron and steel by the use of ore from Lapland.
3. The establishment of shipbuilding yards for naval and commercial use on the reclaimed land.
4. The development of the fireclay industry near Bo'ness, and the extension of other mineral operations.
5. The extension of agricultural land by foreshore reclamations above Bo'ness and Grangemouth.
6. The better utilisation as a source of power of the rivers Avon and Almond.
7. The utilisation of the Union Canal as a local source of power.
8. The construction of a Garden City or residential area at Blackness, with the necessary roads to Bo'ness, Port Edgar, and Philpstoun, and ferries to the Rosyth district.

EARLY MAPS OF SCOTLAND AND THEIR AUTHORS.

(Maps in the Library of the Royal Scottish Geographical Society.)

By HARRY R. G. INGLIS, F.S.A. (Scot.).

UNTIL Ortelius issued his *Atlas of the World* in 1570, the maps of the British Isles in the old atlases were either small reproductions of the grotesque outline of Ptolemy (Fig. 1); the "improved" Ptolemy (Fig. 2), or the elementary shape given to it by the early Italian geographers (Fig. 3), presumably derived from the descriptions of the Venetian sailors. It is therefore at this period that the more reliable cartography of Scotland commences.



The Early Outline of Scotland.

In the introduction to his Atlas, however, Ortelius tells us frankly that he owes the Map of Britain to Mercator, and also mentions Humphrey Lloyd as the contributor of the outline of England; but the puzzle is, that a map engraved by Mercator dated 1564 has been found, which closely resembles Ortelius' Map, and yet examination of the detail shows that the one is not wholly a copy of the other. There is no evidence that Mercator ever was in this country, and, as still another map closely resembling it has been found, it would appear that Mercator must have copied some Scotch map of which we have no record, which has formed the basis of all these early Maps of Scotland. The chief curiosity in Mercator's Map is, that a blur at Perth results in the obliteration of that town, and this is also omitted in Ortelius, but not in the other map. Variations in spelling, and curious misdivision of district names also occur, all pointing to a common original having been followed. Where we are to look for this unknown geographer is a problem that has been left untouched, as none of the writers upon Mercator's Map appear to have paid any attention to these points. Mercator was a Dutchman, and it is manifestly incredible that he would write on a map of his own—for German readers—"Here be daungerous rockes called the Petland Skerries." There are other remarks in medieval English—all on the Scottish part of the Map only, and it is

something of a puzzle that in the published literature upon this map, these interesting points seem to have been overlooked. As Mercator's outline is apparently the first known reliable Map of Scotland, special mention has to be made of this unknown map, as there is no purpose in giving credit to Mercator or Ortelius for work which evidently neither of them originated.

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In the Library of the Royal Scottish Geographical Society, there has gradually accumulated an excellent and quite representative collection of old Maps of Scotland, and as they are readily accessible, it is possible by laying them side by side to observe the work of the different geographers, and see which are really original maps, and which have merely been copied from others. Judging by the maps themselves, there does not appear to have been almost any law of copyright, for the copies and imitations are so barefaced that one wonders whether some of the engravers had any scruples whatever. Thus Blaeu issued a Map in 1634, and Jansson, his rival, retaliated by engraving a map identical in size, wording, and ornamentation, and so closely resembling it that when the two are placed side by side they might be assumed to be the same map. It is quite likely that Blaeu returned the compliment by copying Jansson's (formerly Hondius') Map of the Lothians, issuing it as if it were his own. Also, about 1690, Visscher engraved an exquisite Map of Scotland, and yet about 1710-30 Homann engraved an identical map, so closely resembling the other that, but for the difference in the length of the mark made by the copper-plate on the paper, the one could not be told from the other by an inexperienced eye. The maps on the long list of Maps of Scotland have nearly all been copied from one another, and one can count on one's fingers those that have really advanced the knowledge of the geography of Scotland in the last 300 years.

In order that these differences may be more clearly followed, a series of small sketches showing the outline of Scotland, as adopted by the different Geographers, have been inserted, and if the reader will compare one with the other, the arrows will indicate the parts where the chief points of difference occur. The last of these sketches, Figure 9 (p. 227), shows the modern outline with which the earlier shapes can be readily compared.

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The following is a list of the maps in the Library arranged chronologically, with dates attached. These must be regarded in all cases as only approximate, as the interval between the preparation and publication in most new maps would be three years at least. Thus the Gordon-Blaeu Map was prepared in 1648, is dated 1653, and was published in 1654. It is to be noted that in almost every case these maps were not issued for the purpose of being sold separately, but formed part of large atlases, and their size was governed by their having to be made uniform with other maps.

Names in capital letters in the following list denote the first of a revision of outline.

	Author-Publisher.	Date.	Source.	Nominal Scale,[1] Miles to an Inch.
1.	ORTELIUS,	1573	Mercator.	20
2.	Nagel,	*c.* 1594	No. 1 Ortelius.	30
3.	MERCATOR (second map),	1595	New.	22.
4.	MERCATOR (third map) two sheets,	*c.* 1598	Same as 3 Mercator.	11½
5.	Speed,	1610	Copy of 4 Mercator.	19
6.	Blaeu,	1634	Copy of 4 Mercator.	15
7.	Jansson,	1638	Copy of 4 Mercator.	15
8.	GORDON-BLAEU,	1654	New.	18½
9.	Blome,	*c.* 1670	Copy of 3 Mercator.	15
10.	Greene,	*c.* 1685	Copy of 4 Mercator.	11
11.	Visscher,	1690	Copy of 8 Gordon-Blaeu.	11
12.	MOLL,	1714	New.	12
13.	Senex,	1721	Same as 8 Gordon-Blaeu.	12½
14.	Homann,	*c.* 1730	Same as 8 Gordon-Blaeu.	11
15.	Seutter,	1735	Same as 8 Gordon-Blaeu.	11
16.	Bowen,	*c.* 1750		20
17.	DORRIT (four sheets),	1750	First large-scale map.	4¾
18.	Moll (small),	*c.* 1770	From 12 Moll.	30
19.	Bowles (four sheets),	*c.* 1775	From 17 Dorrit.	7
20.	Armstrong,	1775	From 17 Dorrit.	15½
21.	Knox,	1782	Road map, Dorrit.	12
	Knox,	1788	Road map, Dorrit.	12
22.	AINSLIE (nine sheets),	1789	New outline.	4
23.	Grose,	1791	For Grose's *Antiquities*.	19
24.	Cary (four sheets),	1801	Copy of 22 Ainslie.	8
25.	Fadan (two sheets),	1807	Copy of 22 Ainslie.	7
26.	ARROWSMITH (four sheets),	1807	New survey.	4
27.	Pinkerton (two sheets),	1812	Uncertain.	8½
28.	Ainslie-Fadan (9 sheets),	1836	Same as 22 Ainslie.	4

The maps on this list are of very unequal value, and the following notes will serve to show to what extent each can be relied on, for with the lapse of time, and in the absence of any notes on the maps themselves, the student takes each map at its face value, and trusts to its accuracy without knowing its origin and history.

FIG 4 ORTELIUS 1573

1. ORTELIUS' MAP.—When Ortelius of Amsterdam, the first great geographical publisher, set out to publish an atlas in 1570, he was fortunate in being able to obtain the assistance of the leading geographers in each country, and Mercator appears to have furnished him with an original map of *Britain* which Ortelius used in his first edition of 1570. So successful was this atlas of the world, that several editions were called for, and, with business-

[1] I have been unable to determine on what basis the scales have been laid down, and can only give an approximate figure, as some are in "Scotch" miles and some are in English.

like aptitude Ortelius did not rest content with what he had done, but added fresh maps, and in 1573 his atlas contained separate maps of England, Scotland, and Ireland. The English map is dated 1573, with an acknowledgment to Humphrey Lloyd. The author of the Scottish map (Fig. 4[1]) is not named. This map (corresponding to Mercator's map) is the first really good map of Scotland. One curious feature in this map is the insertion of the island of "Rona" between the Hebrides and the mainland, and this fiction was slavishly followed by all the subsequent map publishers until Blaeu's atlas was published in 1654. It is thus evident that little attempt was made to revise or check the information already published. Although Ortelius is not so well known as the later atlas publisher —Blaeu—he was the pioneer of all atlas publishing, and it is not satisfactory to know that in the standard cyclopædias his splendid work is hardly mentioned. Beginning with 53 maps in his atlas, he had 166 maps in the fourteenth edition of 1612. He had Latin, Dutch, French, Spanish, German, Italian, and English editions, this last being issued in 1606.

2. NAGEL'S MAP.—This is clearly a copy of Ortelius, and we know its value at once by searching for the Island of Arran on the Clyde, only to find that it has been omitted by the engraver. The one interesting feature about this map is, that I have so far failed to come across another copy in any collection in the chief public libraries of Britain. On account of the above-mentioned mistake, as a map it is of little value, but as a curio it is interesting. The date of this map is fairly clearly established, as on showing a photograph to Mr. Chubb, the map curator of the British Museum (who kindly gave me every facility to go over the British Museum maps), he turned up his list of map engravers, and found that another map had been engraved by Nagel about 1594. But for the engraver having put his name on it, the period of this map would have been more uncertain.

3-4. MERCATOR'S (SECOND) MAPS, 1595-98.—Gerard Mercator was a Dutchman who, apparently, to avoid the reign of terror in Holland, crossed the frontier to Duisberg, in Germany, and there issued his maps. On account of the map projection associated with his name, his work is more familiar than that of greater men, and his German residence has been made use of by the Pan-Germanic writers to magnify the work of the early German geographers. Old writers tell us that his real name was Kauffman, modern writers that it was Kremer. The biography in Hondius' Atlas, written shortly after his death, tells us that his father's name was Hubert Mercator, his uncle Gisbert Mercator; and says nothing of an alternative,

FIG. 5 MERCATOR 1595

[1] The arrows on this and on the subsequent outlines have been inserted to draw attention to the points of special interest in each.

nor does it say, as stated in the *Cyclopædia Britannica*, that he engraved a map of Britain *for Camden*. Curiously enough the biography of Hondius in the same atlas tells us that the latter engraved a map of England for Camden, and it is therefore quite likely that some hasty biographer has not noticed which biography he was reading, and has credited the work to Mercator.

Mercator rose to fame as a geographer earlier than Ortelius, and we do not know how he came into possession of the early map of Britain which he engraved in 1564, but he seems to have lent the original to Ortelius for use in his atlas. But the most remarkable fact is that when Mercator (or his sons) decided to issue an atlas also, they discarded this map and followed a totally different outline, which they issued in 1595. There are three maps in Mercator's Atlas—a one-sheet map, and a two-sheet map on a larger scale.

This map of Mercator's formed the basis of almost every map of Scotland for the next fifty years, and one of the simplest tests to use to ascertain if this map has been followed, is to look for the name "Capup" near Jedburgh, which appears on all maps using Mercator's originals. One cannot help wondering why this little farm—once the site of a Roman camp—receives such prominence, when Cessford Castle, only a few miles away, is not even mentioned. It makes one think that there must have been in existence manuscript maps of Scotland far far older than ever has been believed, to account for this curious anomaly. To further distinguish between the outline of Mercator and Ortelius one has to consult the shape of Wigtownshire near Whithorn, and the Mull of Galloway, where in place of the almost uniform length of the two peninsulas in Ortelius' map, Mercator's second map gives a far greater length and a square-ended projection to the Whithorn promontory (Fig. 5).

5. Speed's Map, 1610.—This is a tasteful reproduction of Mercator's map (No. 4), issued in Speed's Atlas, with ornamental pictures of James VI. and Queen Anne his consort down the side. This has to be particularly noted, because the plate—presumably during the Commonwealth—had these pictures erased, and in the same panels were introduced pictures of "A Scotch Man" and "A Scotch Woman," and in the lower panels "A Highland Man" and "A Highland Woman," showing the costumes, but the date on the map was erased, though Speed's name was left. The reprint seems to have been issued by Basset and Chiswell (whose name appears on the map) about 1676. The original edition is dated 1610, and has Sudbury and Humbell's names as publishers. As Speed also issued an Atlas of England, with maps mostly engraved by Hondius, and as the latter was closely associated with Mercator, the map of Scotland is little more than a repetition of the Mercator series of maps, and was probably engraved by Hondius.

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It is now perhaps necessary to make a reference to the remarkable and unrivalled position taken by Holland at this period, in the publishing of atlases. While Mercator was drawing his maps at Duisberg, the prosperous Netherlands were under the iron hand of Spain and the

Inquisition was at work decimating the population. While Ortelius was preparing his atlas at Amsterdam the country was still dominated by Spain, and when part of the Netherlands revolted in 1572, Ortelius was busy with the third edition, preparing the new maps of England, Scotland, and Ireland; and when these were issued, the terrible siege of Leyden by Spanish troops was proceeding. Mercator must have actually risen from his work at Duisberg to see the troops of William of Orange pass through the town on their way to attack the Duke of Alva, in an early but fruitless effort to break the Spanish domination. Yet it is scarcely believable that Holland, notwithstanding its terrible plight, was almost at the zenith of its prosperity; its ships sailed every ocean, and as a sea and commercial power its position was unassailable, and its geographers and publishers, for over a century, were almost the only ones worth taking account of in both the Old and New World. It can truly be said that these early atlases of Ortelius and Mercator, and the engraving work of Jodocus Hondius were prepared amidst the clash of arms, the tramp of armed men, and gruesome burnings and tortures in the public squares.

It was not till 1609 that an exhausted and depopulated Spain reluctantly yielded to the continuous pressure of the businesslike Netherlands, and left that country to develop on its own lines. Mercator's and his sons' work passed back to Holland to Jodocus Hondius, then to Henricus Hondius, and finally to Jansson about 1635. But the greatest rival of the Mercator-Hondius-Jansson firm was W. J. Blaeu, who came forward with his first atlas in 1634; and year by year he and his sons issued volumes of their magnificent *Atlas of the World*. As the first large-scale maps of Scotland ever published were issued in the fifth volume (1654)—which was devoted to Scotland—Blaeu's name stands out in far greater prominence in Scotland than in any other country. Large-scale maps of England had already been issued by Saxton, and such as Blaeu published were not greatly better than those which had already appeared; but the Scottish volume containing Pont's maps was quite new, and this has set Blaeu's Atlas on a pinnacle of fame in Scotland, which he did not attain to elsewhere.

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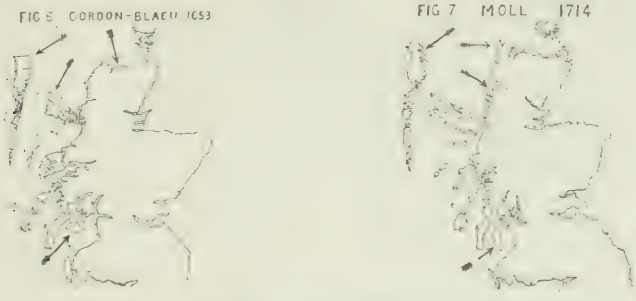
6. Blaeu's (First) Map (1634).—In Blaeu's three-volume *Atlas of the World*, which he issued in 1634, a map of Scotland copied from Mercator was included. Evidently Jansson was seriously disturbed by this, for he had been using Mercator's old maps, so he took Blaeu's map, re-engraved it in facsimile, and then ceased using Mercator's plates.

7. Jansson's Map (1639).—This differs little from Mercator's double map, No. 4: and as Jansson was Mercator's successor he was merely using previous material, making a larger plate to suit the other maps in his atlas. As explained above, the map is actually a copy of Blaeu's map.

8. Blaeu's (Second) Map (1648-54).—Although a loose copy of this map is not available, a copy of the Atlas is in the Library, and it is necessary to refer to it, because it forms the starting-point of an entirely fresh outline of Scotland, and is the cause of the sudden change in the maps of Scotland at this period.

The origin of this atlas lay in the desire of Blaeu's two sons to issue the greatest atlas of the World ever published, and in pursuance of this object they communicated with the Scottish authorities and were put in touch with Gordon, who had rescued the manuscript of a survey of Scotland by Timothy Pont, a minister (*circ.* 1610). Pont had traversed the country



The Gordon-Blaeu and Moll Outlines compared.

patiently and methodically, drawing the different valleys on separate sheets of paper, and then draughting the whole into district maps, in the best way he could. But without a good basis to build upon, it was physically impossible to reconcile all these different sketches, and they passed from hand to hand until they came into the possession of Gordon of Straloch, a geographer of some skill, who redrew these plans and connected them up in a form that made them fairly passable. The chief difficulty he had to contend with was that, until the latitude and longitude of prominent points, such as Fife Ness, Cape Wrath, the Mull of Kintyre, and the Mull of Galloway, had been absolutely established, the work of any surveyor of Scotland could not be much more than guess work, and as Pont's maps were sketches rather than scale-maps, whoever had to work with them had to decide on what scale they were drawn. So difficult were they to reconcile that, in endeavouring to use them, some unknown geographer tried his hand at joining up a map of lower Deeside to a map, clearly on half the scale, of upper Deeside. It is easy for us to criticise this effort and disparage the work of the draughtsman, because we know now the actual distances between certain points from later surveys, and can see that the two maps were on different scales. But the early geographer had nothing of this kind to go on, and the task of fitting two irreconcilable maps together was gone on with, with a result that can be readily imagined. The same thing happened in regard to a map taking in Loch Lomond; while on the west coast of Ross-shire, in drawing the coastline, there is a section in which, instead of adding a part to the foot of the map, the addition has been made at the top.

These remarks are almost essential to understand what happened in regard to the general outline of Scotland. For while these maps in Blaeu's Atlas gave a splendid large-scale record of the country as it was,

the fitting together of these maps, produced so many anomalies, that some parts had to be distorted to allow the maps to fit in to one another. Hence at many points the outline was vastly improved, while at others it considerably deteriorated, but we have from them the first really detailed maps of Scotland. The chief faults to be noted (Fig. 6) are that the outline of Caithness at Duncansbay Head was exaggerated; the shape of the Hebrides was so changed as to be utterly unlike its true appearance; while the Island of Arran was drawn as lying across the Clyde from east to west, instead of north and south. One cannot blame Timothy Pont for this, as he was dead. One cannot blame Blaeu, as he knew nothing of the country, and can hardly blame Gordon, who was trying to piece together a number of maps, of which the author alone knew the scale and the points of the compass.

With this digression on the survey from which Blaeu worked up his atlas, a glance at the outline shows how greatly improved and how much more detailed the map had become. Particular attention has to be paid to this map, because for the next hundred years it formed the basis from which almost every map of Scotland was taken, and was that followed implicitly by the Dutch geographers for the next seventy-five years. To distinguish it from Blaeu's earlier map of Scotland (taken from Mercator's map), this survey may, for identification purposes, be conveniently called the Gordon-Blaeu outline.

9. Blome's Map (*cir.* 1670).—If this map is laid alongside Mercator's map it will be found to have all the same features, but with fewer names, so that this map has no geographical value. The imposing title "By His Majesty's Command" and the coat of arms on it suggest to the uninitiated that it is a work of some credit, but as a map it is no better than the map from which it has been copied. There is a short account of Blome in the *Dictionary of National Biography*, and the allusions in it to what was stated of him by his contemporaries are by no means complimentary. From the tenor of them, he seems to have been a man who lived by doubtful devices.

10. Greene's Map (*cir.* 1685).—This map has no special features, and is merely a reproduction of the Gordon-Blaeu outline, evidently copied from Sanson's (two sheet) map of 1665, from the same source, Sanson's map being issued promptly on the expiry of Blaeu's seventeen year "privilege."

11. Visscher's Map (*cir.* 1690).—This map is not by the elder Visscher, but by his son. There is no more elusive geographer than Nicholas, or Claes *Jan* Visscher. A contemporary of Blaeu, his work seems to run from 1616 on to 1650. But the chief curiosity in dealing with his work is that on some of his maps he prints his name as "Claes Jan Visscher"; then on the same map one can read "Nicholas J. Piscatore" as if the two were different persons, whereas they are the same man. What object was to be served by this is not clear, but one gets the idea that as Mercator was the Latin for the German name of Kauffman, Visscher fancied himself under the Latin name of Piscatore, and as Nicholas is the French form of the Dutch name "Claes," it may be possible that there was a definite object in this, to naturalise his

Atlases in France, with which country he seems to have had a very strong connection. His son, Nicholas Visscher, began issuing maps about 1656. It is interesting to note that this map must have been almost the last of Nicholas Visscher's work, for in his Atlas Minor (*cir.* 1678), he always uses De Wit's map of Scotland, so that this map is not likely to have been ready before 1690.

The Visschers were very strong rivals of the Blaeus, and they seem to have spent money lavishly on fresh plates for their atlases, but except in one or two rare instances—copying Blaeu's example—they never allowed any engraver to adhibit his name as having engraved the map. Their own names, either as author, director, or publisher, had to appear alone. This Map of Scotland by Visscher, bearing his own name as geographer, is wholly copied from the maps in Blaeu's atlas, is a much larger-scaled general Map of Scotland than the one that appeared in Blaeu's book, and was one that was copied by several engravers, word for word, and so closely resembles it, that if they are placed side by side, only the colouring shows at first that it is not the same map. The designs for the titles of Nicholas Visscher (the son's) maps are real works of art, the delicacy of the engraving being such that few maps excel them in beauty of appearance, while the fully coloured copies are gorgeous in their display of gold and colour.

12. Moll's Map (1714).—Hermann Moll appears to have been an engraver in London who did some of the plates for Greenvile Collins' *Coasting Pilot* as far back as 1687, while he also engraved Adair's Map of "Sterlingshire" in 1688. Apparently he seems to have taken up the idea of publishing an Atlas of his own, but instead of copying the other maps that had already been issued, he seems to have been at great pains to try to issue a map of Scotland considerably in advance of, and better than, anything that the Dutch geographers had done. It would almost seem as if he had gained access to some of Adair's maps of Scotland, because we notice at once (Fig. 7) that he has put aside the outline of the Pentland Firth of the Gordon-Blaeu maps. He corrects the island of Arran, shifts Coll and Tiree a little farther north, and improves the coastline of Aberdeenshire as well as that of Fife. It would almost seem as if Moll had sought out every available source of information, and had brought it all together in this up-to-date map. Moll takes credit to himself for having done this, and calls attention in his map to the mistakes and errors of others which do not appear on his maps. The pictures round the margin of the map are from Slezer's *Theatrum Scotiæ*.

13. Senex's Map (1721).—If this map is placed alongside Visscher's map it will be observed that the two are identical in outline, and here again we have a slavish copy of Visscher's work without any traces of originality. There is no change in the outline, and the one map is just as good as the other.

14. Homann's Map (*cir.* 1730) is a very fine illustration of a matter that is only too frequently overlooked by students of map history, especially where there is no opportunity of laying one map beside the other to compare them, for this is actually Visscher's map, re-engraved

even with the elegant title reproduced so that the one map is almost indistinguishable from the other, except that the degree lines are omitted. Homann is a worker difficult to date, because so much of his work was published under his own name, and so much under the name of his heirs "J. B. Homanno heredibus."

15. Seutter's Map (*cir.* 1735) was also engraved for an Atlas (like all the maps of the Dutch geographers), but except for subtle changes in the angle of the engraved lettering, can hardly be distinguished from Visscher's or Homann's map. In possessing Visscher's, Homann's, and Seutter's maps, the Scottish Geographical Society is fortunate, as the student can place the three maps side by side and see at once the similarities and differences. Apart, each map appears to be quite a good representation of Scotland, but once placed side by side it is quite evident that Visscher's is the original, and the others are really of no special value. Since Visscher was dead, all that Seutter appears to have done was to hand Visscher's map to an engraver, with instructions to copy it. A tracing of the map seems to have been rubbed down on the copper, and the map engraved the same in every detail, though the title scroll is different. It is a masterpiece of copying. A very pardonable mistake, that can easily be made, is to attribute this map to Augustae Vindel, whose name appears at the end of the title on the map, but this is merely the Latin form of Augsburg—Augustae Vindelorum—and is not the name of a person.

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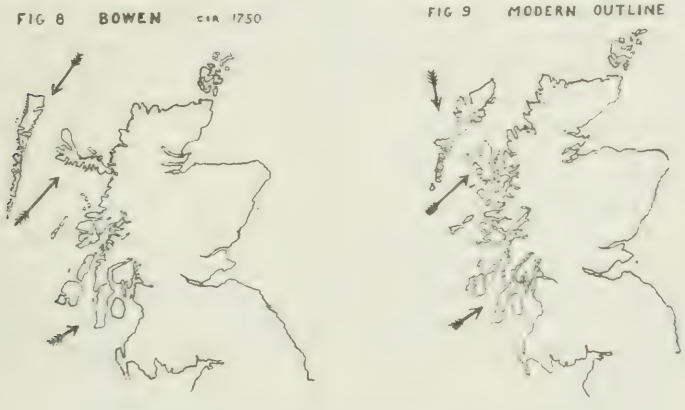
We now come to the period of the commencement of more methodical surveys. The Rebellion of 1715 had found the authorities without any proper maps of Scotland, and, in order to cope with the clan system, military roads were commenced through the Highlands. These all involved a certain amount of surveying, and by the time the second outbreak in 1745 had shown the military authorities their unpreparedness in the way of maps, a certain amount of general work had been done, the history of which is at the moment obscure. So far as the coast outline is concerned, we know that Adair had completed and published his maps of the East Coast as far north as Aberdeen, by 1703. His manuscripts of the Clyde and south of Scotland, as well as of the West Coast, seem also to have been available by 1710: a survey of the Peterhead Coast by Jaffray had been made and issued in 1735; an excellent map of the Moray Firth had been published in Greenvile Collins' *Coasting Pilot* in 1695; while a survey of the Pentland Firth and north coast was completed by Bryce in 1744. Therefore there only remained the Hebrides and Skye coast to be completed, and in the next maps these are gradually bettered, presumably from M'Kenzie's survey of 1750.

16. Bowen's Map (*cir.* 1750) has a much better outline of the east and south coast (Fig. 8), varying little from what is shown in modern maps, yet we notice on the west coast the Gordon-Blaeu outline of the Hebrides, which is not nearly such a good outline as the Mercator map of 170 years earlier, and an outline of Skye that is almost as bad.

17. Dorrit's Four-sheet Map.—In the year 1750 Dorrit published

the first large-scale Map of Scotland that had ever been issued. This map is in four large sheets, and is on the quite good scale of 4¾ miles to an inch. From the completeness and detail shown, as well as the originality of the outline, it would almost seem as if Dorrit had access to some of the military maps used in the '45, for no other original maps are known at that period. Of course Moll had also issued his small *County Atlas of Scotland* in 1724, but *it* is clearly made up from the later maps of Adair, and (where these were not available) from Pont's maps in Blaeu's atlas. There was also available at that date for the centre of Scotland, the excellent manuscripts of Edgar, 1743-5 (who seems to have been one of the chief military draughtsman), for Peebles, Stirling, Dumbarton, Perthshire, and the military roads through the Highlands



Bowen's Outline compared with the Modern Map.

as far as Inverness. To pass any criticism on Dorrit's work would, however, be quite unjust to the courage and patience of the author, and one can do no more than say that he seems to have consulted the best authorities, and, though the engraving is a little rough, the map gives the student a very excellent view of Scotland as it appeared to be known in 1750.

18. Moll's (Small) Map (*cir.* 1770) is reduced from Moll's first map issued about 1714, and apparently brought out about 1770. It has no special features, and one has some curiosity to know how Moll's name was brought forward again, when it must have been obvious to all that his work was quite out of date. At the same time, it seems to bear testimony to the endurance of his fame, which, after all, is the test of the best work.

19. Bowles' Map (*cir.* 1775), another four-sheet map, is a fine specimen of an enterprising London publisher's work. The Bowles as publishers had been in existence since 1714, and this map of Carrington Bowles, issued jointly with R. Sayer and J. Bennett, is a fine production on the scale of 4¾ Scottish or 7 English miles to an inch. It seems to have been worked up largely from Dorrit's map and the Military

Survey, and other available sources are already referred to. It is issued in Kitchin's atlas along with the large-scale maps, by Rocque, of England and Ireland, and gives a very excellent and fairly accurate outline of Scotland. This map appears to have been the standard map until Ainslie's map was issued in 1789.

20. Armstrong's Map (1775) is clearly based on maps produced subsequent to the Great Military Survey of Scotland in 1754, which lies in manuscript in the British Museum. As a map it has quite a neat outline, but as it is merely copied from another source it has no special characteristics of its own. The gallant Captain also issued (in addition to several maps of English counties) surveys of the counties of Ayr and Berwick, both of which are referred to in Thomson's *Atlas of Scotland* (1830) in the most uncomplimentary terms as to their accuracy. At this far-off period it is not easy to say where the faults lay, but as Thomson lived about thirty years later than Armstrong, there was no question of rivalry, and the remarks as to their inaccuracy were very pointed. One must, therefore, assume that Thomson did not write his notes without some justification.

Many small maps were issued at the end of the eighteenth century, and call for little comment as they are merely reproductions from the larger maps already described.

21. Knox's Map (1782-8) is merely a map showing the coaching roads, with remarks on the more remote parts of the Highlands, and is useful in enabling one to pick out the roads. There are two copies in the Library, one dated 1782, the first edition, and one published in 1788. As a map it is more utilitarian in its purpose than geographical.

22. Ainslie's Map (1789), in nine sheets (Library copy corrected to 1800), is a wholly new outline of Scotland, different in almost every part from any map previously published, and, so far as results are concerned, at that date it was the most reliable map of Scotland. Nothing appears to have been copied from the previous maps, and all the information seemed to be derived from the various county maps which began to be issued at this period.

23. Grose's Map (1791) is merely a map of Scotland sent out with Grose's *Antiquities of Scotland*, and as a contribution to the geography of the country is of no special value. It also was a map brought out for a special purpose, and claims no originality.

24. Cary's Map (1801), four sheets. While Cary was an exquisite engraver, turning out work of a quality second to none, as a geographer it is doubtful if anything original can be attributed to him. His map is clearly copied from Ainslie, or from the same originals.

25. Fadan's Map (1807), two sheets. Fadan acknowledges that his map is copied from Ainslie, and this is its true value.

26. Arrowsmith's Map (1807), four sheets. This map is another new and highly important survey of Scotland, displacing all the previous geographers' work and placing the outline of the country almost in its present state. It is on the same scale as Ainslie's map, and appears to have been worked up from Government surveys available. The letter-

ing is very small, and so the map is in such close detail that it almost contains more names than maps of far greater pretensions.

27. PINKERTON'S MAP (1812), for Pinkerton's atlas, engraved by Neale, appears to have been copied from some other map, and (probably intentionally) the outlines of Arran and Islay distorted to make the map look different. As a map it is therefore of very doubtful value.

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Summarising the results of a collective survey of this kind, the first point that is evident is that a study of the various outlines reveals that the maps with square-ended projections to Wigtownshire can be readily dated as being between 1600 and 1650, while those which have a square-headed Hebrides can be at once relegated to the 1650-1750 period. A second point worth noting is the fact that we rarely owe any map to the geographer whose name it bears, but generally to some obscure individual whose work has been incorporated in the larger production.

Another point that is rather too technical to deal with in a broad survey of this nature, is the fact, that while Ptolemy placed the most northerly point of Scotland (mainland) at 61° 40′, the Mercator and Italian group placed it at 60° 30′, the Gordon-Blaeu at 59° 15′, Moll at 59° 5′, while the correct position is 58° 45′. As landsmen seldom use degrees of latitude and longitude, it is quite evident that we are here dealing with nautical observations, which must have come into the hands of the various geographers and caused them to alter the position of Scotland from that of Ptolemy by nearly 3° or about 200 miles.

The reason why so little is known to-day about the old maps and the old geography of Scotland is that there is no readily accessible and well arranged collection of maps in any library. We have hitherto only had the observations of geographers who (having only access to a limited number of early maps) have been handicapped by there being no available collection exhibiting the progressive development of cartography. It is for this reason that support of the action of the Council of the Royal Scottish Geographical Society in setting out to form a NATIONAL COLLECTION OF OLD MAPS OF SCOTLAND will be invaluable. The information on which this article has been based has only been obtained through the courtesy of the Librarians of the chief libraries of Britain in readily granting facilities for the comparative study of the different maps, so that the one could be compared with the other. It is therefore extremely desirable that a collection of the kind suggested should be taken in hand by a body thoroughly conversant with topographical matters, so that it would be methodically and suitably arranged. The average Library, as a rule, is largely literary in its scope, and a topographical collection is a separate department requiring special knowledge and arrangements, such as a Geographical Society possesses.

Since this article was written, Dr. W. B. Blaikie has presented to the Society a splendid portfolio of forty-four maps of Scotland, which he has collected gradually, and this, added to those already in the Library, is a great step forward. In this matter the Society is entirely dependent on the interest and generosity of its Members and friends.

There must be many old maps lying in private libraries that are hardly ever consulted, and if these could be given to the Society, they would at once become of general utility. I therefore venture to take this opportunity to draw attention to the Council's appeal for further contributions of Maps, Atlases, Charts, Road Books, Town Plans or old Estate Plans, so that there will be at least one central collection in Scotland where any one can go with the certainty of finding the most complete set of Maps that can be gathered.

THE LIFE OF SIR COLIN SCOTT-MONCRIEFF.[1]

THE Editor explains that this book is an attempt to record for his descendants, kinsfolk and friends, the long, useful, noble life of Sir Colin Scott-Moncrieff. But it is well that the career of such a great Scot should have been related to a still wider circle—to the many admirers among his countrymen who knew of his deeds but had not the privilege of his personal acquaintance.

Colin Scott-Moncrieff came of an old and worthy Scottish stock. His forebears were men of valour and patriotism, some of whom died at Flodden, while others were good Covenanters who placed loyalty to conscience before their worldly interests. He was born in 1836 at Dalkeith; and being the sixth of seven sons, the family estate of Fossaway was not likely to come his way. It used to be said that the principal exports from Scotland were "black cattle and younger sons," and Colin's lot was to seek his fortunes among the latter and go forth to enter the corps of Engineers in India in 1858, when the Mutiny was still in progress. He served a long and varied apprenticeship as an irrigation officer, and, although he was not a notable constructional engineer, he learned the general principles of working the vast complex machine and utilising for the benefit of the cultivator the great volume of water placed at his disposal. Science was brought into touch with humanity, and the work of seeing that the poor man got his share as well as the wealthy strongly appealed to his kindly and generous nature.

But it was in Egypt that his early training was destined to bear its full fruit and make his name famous. After his valuable experience in India, supplemented by visits to irrigation works in Spain and Italy, and especially after his great work in the famine districts in Mysore in 1877, his qualifications for higher degrees of imperial work became fully recognised. He had intended to retire, and was returning from India in 1883 to spend, as he hoped, the rest of his days as a pensioner doing useful if less strenuous work at home: but while visiting Cairo on the way, Lord Dufferin offered him the post of Director of Egyptian Irrigation, a position of great difficulty that only a man of the highest capacity could fill successfully. The nine years that followed were

[1] *The Life of Sir Colin C. Scott-Moncrieff.* Edited by Mary A. Hollings. London John Murray.

most eventful and happy ones for Egypt, and Sir Colin's own contribution to the unravelling of the tangle of economic and political chaos in which he found the country involved was a contribution of which all his countrymen were justly proud, and for which the Egyptians in time became as truly thankful.

It is a wonderful bit of history that is now related, but we shall confine our attention to the more purely geographical side of the watery chronicle. "Happy is the reformer," he wrote, "who finds things so bad he cannot make a movement without making an improvement." His first summer was spent in going round and getting a general grip of the work and inspecting what his predecessors had tried and had failed to accomplish. The ancient method of irrigation which had been in vogue for 6000 years in the rainless land of Egypt was to wait till the Nile overflowed its banks in the end of summer, and to impound the turbid floodwater in huge basins surrounded by embankments, until the mud had settled and fertilised the plain. The spent water was then run off by canals, and the ground sown and cultivated after the flood had subsided. If more water was required during the dry months when the river was low, it had to be laboriously raised by pumps or primitive appliances worked by men or animals. Large tracts of country obtained little or no water under the old system, and perennial irrigation was only possible when the river water could be raised or pumped up in large quantities at all seasons, so that two or even three crops could be grown on the same land every season, and the greatest return derived from it.

The first attempts at perennial irrigation had been made by Mohammed Ali, the great Pasha of Egypt, who ruled with energy and intelligence, but in a fickle and entirely autocratic oriental style, from 1805 till 1848. In the ancient Pharaohs' days the country had supported a population, it is believed, of some 12,000,000, but under Arab and Turkish misrule, it had sunk in 1800 to two millions. Mohammed Ali introduced cotton in 1820, which is a summer crop of the greatest importance, and with cotton cultivation the modern chapter of Egyptian irrigation opens. Cotton must be protected from inundation and be planted and irrigated before the Nile begins to rise, at a time when the river is low. To obtain water at this season Mohammed Ali had ordered his engineer, Linant Bey, to proceed with plans for two great dams called barrages, with piers and sluices, to be constructed across the branches into which the river splits below Cairo. In 1833 a dam was begun across the western or Rosetta branch, and, as another was rendered necessary, a second on the eastern or Damietta branch was decided on. For this purpose the autocrat ordered the Pyramids of Gizeh to be demolished to provide the needful stone. Linant deserves all credit for his diplomacy in preventing this unspeakable piece of vandalism by convincing the autocrat that the stone could be got more easily and cheaply by quarrying it. The work was begun by vast numbers of slaves, among whom plague broke out, and in 1833 it was abandoned, as the autocrat had by then grown tired of the attempt. Another French engineer, M. Mougel, seven years later, persuaded

Mohammed Ali to resume the work, but at a new place fourteen miles below Cairo, and the structure was begun in 1843. In such a hurry was the Viceroy to have the work completed that the engineer was ordered to dump into the river 1000 tons of concrete every day whether practicable or not, with the result that at certain times the current was so strong that all the mortar was washed away, only loose stones being left for the foundation. The beautiful superstructure of arches carrying the fine roadway was completed in 1861, with *corvée* labour, in spite of which the cost was £1,800,000. But after the sluices were closed so as to raise the water a few feet, numerous defects and cracks appeared, and in 1867, when another attempt was made to hold up the water, part of the Rosetta barrage separated and began to move bodily down the stream. Ten arches gave way, and after the structure had moved about 8 inches, the further attempt to use the great barrage for anything more than a bridge was given up in disgust. When Sir Colin Scott-Moncrieff appeared on the scene forty years after the barrage had been begun, he was solemnly warned to have nothing to do with the doctoring of such a hopeless patient. All European experience was against him, but his courage did not fail, and after great trouble and persuasion he obtained permission from the Government, and a little money, to try the repair of part of the structure. Assisted by Mr. (afterwards Sir William) Willocks, the problem was skilfully and boldly tackled bit by bit, and it is a matter of history how success attended his boldness; and after several years of arduous work, first under Sir Colin, and afterwards under Sir William Garstin and other eminent engineers, the whole structure was by degrees permanently repaired and the foundation solidified and greatly strengthened, so that the low Nile can now be all safely raised into the irrigation canals required for cotton cultivation in the delta.

The enormous success of Sir Colin's bold experiment led to many other and far greater irrigation works on the Nile, including the Dam at Assuan and the Barrage of Assiut, which were completed in 1902. These costly structures, all made by free labour, have long ago fully repaid the large sums that were spent on them under British rule, and have brought unheard-of prosperity to the whole land of Egypt.

But Scott-Moncrieff's name will be associated with other reforms besides those of the water supply. From the beginning of his work in Egypt, he resolutely set himself to assist Lord Cromer in the abolition of the *corvée*. In 1883 the number of unpaid labourers who were turned out to clear the silt from the canals was 106,000, working for 100 days a year under the liberal application of the *kourbash* to the naked backs of the unwilling workers. In 1884 this number was reduced to 88,299, and when Lord Cromer finally abolished the lash in 1885 the men refused to turn out, the only inducement having been removed, so that paid labour had to be introduced. The final result of Lord Cromer's humanity has been entirely satisfactory. It is also recorded to Sir Colin's everlasting credit that when he found M. Mougel, the architect of the first barrage, cast aside and forgotten by an ungrateful Government, and living in poverty in Cairo, he never rested till he

obtained a government pension by which the unfortunate old engineer was able to spend his remaining years in some degree of comfort and respectability.

The British Empire owes its greatness to men of heart as well as men of head, and when Sir Colin went to Egypt he found very few persons of the former category in power in that oppressed and distracted land. After nine years of strenuous work, when in 1891 he bethought himself of returning home, his good friend Nubar Pasha called and pathetically asked, "Is it true you are thinking of leaving Egypt? Don't do it. If you go, the *corvée* comes back; many bad things come back—all goes back. If ever you must go, see that you send a man of heart; mind not about his being a clever engineer; that is work easily got, but before all, send a man of heart." But in January 1892 a great blow fell on Egypt in the sudden death of the Khedive Tewfik Pasha, whom Sir Colin described as the best Turk he had ever met, not particularly enlightened or educated, but loyal, true and pure in life, with the single wish to do good to his country. His son Abbas, a young man of very different type, who was finally deposed in December 1914, succeeded as the new Khedive. In October 1892 Sir Colin writes: "It is the old, old story of an Eastern Court. Rehoboam cares not for his father's friends, but picks up young blades like himself." The new Khedive was quite courteous and civil, but that was all, when Sir Colin paid his farewell visit and returned home to other and more congenial surroundings.

The geographical part of the narrative ends in 1892 when Sir Colin became Under-Secretary for Scotland, a post he held till 1902, when he retired after forty-four years of distinguished public service. Lord Milner says in *England in Egypt* that it is the chiefs of the Irrigation Service who have succeeded in overcoming all the odium that naturally attached to them as foreigners and Christians, and that they enjoy not only popularity but extraordinary and even touching confidence as the reward of their ceaseless and unselfish labours.

Sir Colin Scott-Moncrieff came at a time of chaos when the country was on the verge of bankruptcy and ruin, and, largely as the result of his boldness, skill, and humanity, the crisis was gradually surmounted, and Egypt became well watered, and thereafter reconciled to the rulers who had rescued her and brought to the people an honest Government, with prosperity and plenty that far surpassed their wildest dreams.

Sir Colin was thrice married, but had only one son, Colin, a worthy chip of the old block, who, to his father's unspeakable grief, was treacherously murdered in the Sudan in 1908 by Dervish fanatics, among whom he had incautiously gone unarmed and alone to hold a conference on their alleged grievances. During his later years he travelled widely in the New and Old World, and his long and useful life of nearly eighty years, which lasted into the great war, came quietly (and quickly) to a close on 6th April 1916, at his house in Chelsea.

This biography, which is well illustrated, contains many characteristic letters, as Sir Colin was a good correspondent, and a man greatly

beloved, who had many friends to write to. Had the work been originally designed for the general public, no doubt the family correspondence would have been less prominent and the plan slightly different; but the editor has been assisted by various notable contributors, and has succeeded in drawing a happy picture of a truly good and great man and his doings—a Christian gentleman, whose career has left its permanent mark on the face and fortunes of at least one part of the old blighted Turkish empire, and has pointed the way of the restoration of other desolated regions that only require such men and methods to bring prosperity and unspeakable blessings to millions of their miserable inhabitants.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

At a meeting of Council held on Tuesday the 14th of May 1918, the proposal for the formation of a National Collection of Old Maps of Scotland set forth in the leaflet which is enclosed in this month's Magazine, and to which a slip attached to the cover also refers, was considered, and the meeting unanimously pledged the Council to the support of the proposal.

At the same meeting the Secretary intimated that he had been informed that it was now proposed to establish in Edinburgh a Society affiliated to the Anglo-Spanish Society, one of the objects of which is stated to be to co-operate with Geographical Societies.

GEOGRAPHICAL NOTES.

Europe.

The Village Industries of Russia.—A recent issue of *Le Globe* (vol. 56) contains a summary of a lecture delivered before the Geographical Society of Geneva by M. Albert Roussy on this subject. The lecturer stated that, of the 150,000,000 inhabitants of Russia in Europe, some 115,000,000 are peasants, of whom about 8,000,000 are engaged in some form of village industry. The definition adopted of these industries is that they are small family organisations for the production of objects whose market is found chiefly among the rural population, and are carried on only as accessories to agriculture. It follows that the distribution of these manufactures depends upon the nature of the surface. Where the soil is rich, as occurs especially in the Black Earth zone, and the climate favourable, the time of the agricultural population is fully occupied on the land, and accessory occupations are not economically necessary. Where the climate is too severe for work in the open during many months of the year, opportunity is given for small manufactures, which form a very welcome supplement to the

family income. Again, where the lands produce little, such accessory industries become a necessity. The result is seen in the proportion of the income derived from industries as compared with that derived from the land in the various localities. In some areas the former rises to 20 per cent., or even 45 per cent., of the total, while in the Black Earth belt the percentage is negligible. The part taken by the members of the family in the industries is illustrated by an account of the manufacture of wooden spoons. This is carried on especially in the government of Nizhni and Viatka. Children of seven to ten years of age are given pieces of wood of suitable length, and round off one of the ends. Those of ten to fifteen years hollow out the bowl of the spoon. The adult members of the household smooth the rough wood, and the girls decorate the spoons with simple patterns. The men then colour the designs and bake them in the stove; more elaborate specimens are sculptured by special workmen. Thus about ten persons combine to produce the finished product. Some 150,000,000 such spoons are sold in the year, bringing in a sum of about 1,000,000 roubles.

Generally the industries depend upon local supplies of raw material, wood being of course the commonest. The original market for the surplus was the village in which the article is produced, but since the villages tend to specialise in a particular article, these must generally be sold in adjacent villages or at the great fairs. Sometimes the makers themselves peddle the goods at a distance; latterly the tendency has been for the goods to be bought in the villages wholesale by representatives of the town merchants. The profits, as one would expect from the loose organisation, are small, this being especially the case with the lacemakers, whose continuous toil yields the merest pittance. The labour of seven to eight million peasants brings in a total sum of some 500,000,000 roubles per annum (the pre-war value of the rouble was about 2s.). The profit per head is rarely more than 70 roubles per annum, while the lace-makers gain only about 20 roubles per head per annum for their continuous and arduous toil. It is noted that, as compared with the eight million home workers, the factory workers of Russia number only about two millions, the proportion being very different from that which prevails in the rest of Europe.

America.

The Rainfall of Kauai.—Prof. Douglas H. Campbell, of Stanford University, contributes to *Science* a brief note on some peculiarities of the rainfall of this island. Kauai is the northern member of the Hawaiian group, and is almost circular in outline, being rather less than thirty miles in its greatest diameter. It consists for the most part of a plateau with an average height of 3500 to 4000 feet, but rises to over 5000 feet in Mount Waialeale, placed almost in the centre of the island. As in the other Hawaiian islands the precipitation is heavy on the windward or north-east side, and light on the leeward side, but the rainfall conditions on the culminating point seem altogether exceptional. Apparently records are only available for six years, too short a time

of course for any exact conclusions to be drawn, but the striking point is the very heavy fall on Mount Waialeale and the low precipitation at the village of Waiamea, which is distant from the mountain 13·5 miles in an air line, but lies only 10 feet above sea-level. The five-year period 1912-16 gives a mean of under 21 inches of rain for Waiamea, as against one of 518 inches for Mount Waialeale. The lowest annual fall on the summit was just under 400 inches in 1912, the highest 610 inches in 1914. At Waiamea in the same years the figures were respectively 20·5 inches and 24·5 inches. It is rather interesting to contrast the figures for Mount Waialeale with those for Cherrapunji, usually regarded as the wettest place on the globe. According to Mr. Watt (cf. *S.G.M.*, xxxii. p. 195), a forty-year average there yields the figures of 425 inches, the maximum fall during the period being 550 inches. Cherrapunji lies about one thousand feet lower than the summit of Mount Waialeale.

Professor Campbell states that Waialeale is rarely free from rain clouds, and the precipitation is almost incessant. The whole region near it is a bog, partly covered with a forest of low trees, thickly draped with dripping masses of mosses and liverworts. Part of the area, however, including the summit of the mountain, is an open bog, covered with coarse grasses and sedges, with a few stunted shrubs and various characteristic bog plants. Mr. W. V. Hardy, hydrographer of the United States Geological Survey, has been keeping rainfall records on the summit of Mount Waialeale for the past six years. The village of Waiamea, as the figures suggest, is placed on the leeward side of the island.

Australasia.

Spelling of Dirk Hartogs' Name.—In connection with Mr. W. Siebenhaar's article on "Dirk Hartogs' Landing in Australia," which appears in the January issue, page 20, we have received from Mr. Siebenhaar a note on the two spellings of the Dutch explorer's name, from which we quote the following:—"The name 'Hartogs' is the old Dutch abbreviation for 'Hartogszoon' (the son of 'Hartog'). It is obvious, then, that the abridged form 'Hartogs' needs the *s*, originally a genitive one, but now an integral part of the name. Some twenty-five years ago the Lands Department of Western Australia decided to drop, in all geographical names, the genitive letter *s*, as in 'Hontman's Abrolhos,' 'Dampier's Archipelago,' etc. Mistaking the *s* in 'Dirk Hartogs Island' for a similar genitive one, the authorities cut it out also in that case. Not long after I pointed out the error, but the mischief had been done, and the new maps printed. They have since been corrected, but, of course, in the meantime the wrong spelling has got into maps and books all over the Empire."

General.

The Royal Geographical Society's Medals and Grants.—It is announced that the Founder's Medal has been awarded for the present year to Miss Gertrude Bell, for her important explorations and travels

in Asia Minor, Syria, Arabia, and on the Euphrates, and the Patron's Medal to Commandant Tilho, French Colonial Infantry, for his long-continued surveys and explorations in Northern Africa. The medals are to be struck in bronze instead of gold, owing to the shortage of gold, the balance of the value being given in War bonds.

The Murchison Grant goes to Mr. C. A. Reid for his maps of the Belgian Congo: the Cuthbert Peek Grant to Mr. G. F. Archer for his surveys in East Africa: the Back Grant to Captain Bartlett for his distinguished leadership after the loss of the *Karluk*; and the Gill Memorial to Captain Cuthbert Christy, R.A.M.C., for his surveys and explorations in Central Africa.

Address on the Aims of the Royal Scottish Geographical Society.—Mr. R. W. K. Bain, Hon. Secretary of the Aberdeen Centre gave an address to the Rotary Club, Aberdeen, on April 25th last, by special request, on the aims and objects of the Society. In his address Mr. Bain dwelt upon the changes which have taken place in the whole conception of geography and geographical teaching within recent years, and went on to speak in detail of the activities of the Society, and of the appeal which these make to various sections of the community. He pointed out that in Aberdeen, despite the size of the town, the membership is comparatively small—smaller even than Dundee, and urged the great desirability of increased interest on the part of the general public both in Geography in the enlarged modern sense and in the work of the Royal Scottish Geographical Society.

Personal.—The Council of the American Geographical Society of New York has elected Dr. Marion I. Newbigin a Corresponding Member of the Society.

NEW BOOKS.

ASIA.

The War and the Bagdad Railway: The Story of Asia Minor and its Relation to the Present Conflict. By Morris Jastrow, Jr., Ph.D., LL.D. Philadelphia and London: J. B. Lippincott Company, 1917. *Price 6s. net.*

As the title and the sub-title indicate, there is a four-fold division in Professor Jastrow's new book. Two sections, of about fifty pages each, form the central portion, and set forth the history of Asia Minor and of the Bagdad Railway respectively. These historical sections are flanked, in the opening and closing chapters, by two shorter sections, which respectively discuss the underlying causes of the Great War and speculate on its most probable issues. The two central historical sections are of special *value*, for they are written out of the exact and well-digested scholarship of an expert—Professor Jastrow's great work on *The Civilisation of Babylonia and Assyria*, was reviewed at length in this *Magazine* for September 1916. The two flanking sections are of special *interest* as the reflections of a learned American professor, educated in Germany, upon the motives and issues of this all-engrossing war.

In Professor Jastrow's view, "The Story of the Bagdad Railway," the second of the two central historical sections, is only the last-written chapter of "The Story of Asia Minor," the first of the two; and the importance of that latest chapter, in his view, may be gauged from the fact, already indicated, that the four thousand years of the history of Asia Minor and the twenty-six years, 1888-1914, of the history of the railway, receive about the same number of pages for their treatment. Neither are the opening or closing political chapters, in the author's view, merely patched upon the historical sections. Throughout the book, the author's insistent and very interesting reasoning is that the Constantinople-Bagdad or Constantinople-Basra Railway across Asia Minor is on the great highway of the Eastern hemisphere, and that possession of that highway eastwards always determined Old-World history, and is the prize for which the European nations are at present contending in mortal strife.

Bold though it may seem to say so, conviction of the truth of the author's two theses does not take the reader's mind captive. More important for world-power, surely, is the command of the Suez Canal and its natural extensions, the Mediterranean and the Red Sea with their outer gateways into the oceans at Gibraltar and Perim respectively—the thesis lately developed in one of the Scottish Geographical Society lectures. Indeed, might not the present war in its earliest, motive-revealing stage be as truly declared a push for Salonika and the *waterway* eastward as a contest for Asia Minor and the land route? At least, if the predominant importance of the Mediterranean-Canal-Red Sea highway in a world-war is not so apparent, its supreme importance in world commerce cannot be gainsaid. An illustration may be given of Professor Jastrow's prepossessions regarding the supreme importance of the Asia Minor land-road to the East, with his corollary therefrom that Germany's determining motive when she was planning the war, and manufactured a plea for it, was to gain command of that overland route. Napoleon felt the pressure eastwards, Professor Jastrow rightly says, and made for Egypt in 1798. After that, according to accepted history, the Syrian expedition was forced upon Napoleon by the destruction of his fleet at the battle of the Nile. Napoleon's dream of an Eastern Empire to be won *via* Egypt and the Red Sea was dispelled, and in its place a vision of the conquest of Turkey and of Europe taken in the rear presented itself. That is the accepted history. According to Professor Jastrow, Napoleon's occupation of Egypt was merely the preliminary step. "His *design* was to make himself master of Syria, and thence to threaten the possession of the Asia Minor highway." What the author says of the Crusades may also be quoted in illustration of the same prepossession. "Recovery of the holy sites," he says, "is an incidental feature of the Crusades. . . . The Crusades are a part of the 'trend toward the East,' which has always been a motive power in Western lands, and has in our own days given rise to the Bagdad Railway as its latest manifestation." Many such illustrations might be quoted.

Emancipated from German bullying of our minds as well as of our politics, one is now disposed to question altogether the "trend eastward" as a permanent world-factor, or as more than a particular case to-day of the inevitable extension of influence by an energetic people over peoples which have become lethargic and easy-going. The recent elevation of the principle into an external and compelling force in the life of nations now seems rather like Germany's excuse for wolfish eyes upon Asia Minor and Eastern trade. Had there been no Monroe doctrine, the trend might as likely have been westward, towards South America. Germany's geographico-political principles are not constants. When she holds the coast, as in Africa, then possession of the coast confers a right to the region behind, when

she does not hold the coast, as in Europe, then possession of the region behind confers a right of access to the sea.

Professor Jastrow's American standpoint is interesting. One might refer in illustration to what he says about Persia and the Anglo-Russian Agreement of 1911, but a more interesting point is his several times repeated statement about the *two* great wars, that of 1914, "the European struggle for supremacy," and that of 1917, onwards, "the world war for democracy." The new aspect was clinched, the author says, by "*our* entrance into the war." The English-speaking people on this side of the Atlantic would say that Professor Jastrow's distinction between 1914 and 1917 is rather proof of the slow opening of American eyes to what the war meant from the very outset.

Nor can one accept a correlated distinction, evidently still made by the author, that the war on the Western Front is for the preservation of democracy, while the war on the Eastern Front is for the eastward road and ascendancy in the East.

The author's hopes for the East in the final issue of the war are "International-isation" of Constantinople, the Constantinople-Bagdad Railway, Armenia, and "co-operation with," not exploitation of, "the East."

ECONOMIC GEOGRAPHY.

Cotton and other Vegetable Fibres: Their Production and Utilisation. By Ernest Goulding, D.Sc. (Lond.). With a Preface by Wyndham R. Dunstan, C.M.G., LL.D., F.R.S. London: John Murray, 1917. *Price 6s. net.*

This volume is one of the Imperial Institute Series of Handbooks to the Commercial Resources of the Tropics, and has been prepared in order to summarise the position and prospects of the world's production and utilisation of fibres, with a view to making clear how far it is possible, after the war, for us to hope to draw our supplies to a larger extent than before from the countries within the Empire.

As might be expected, cotton, the most important of the fibres, receives the largest amount of attention, no less than three chapters, out of a total of eight, being devoted to it. To the geographer, however, some of the accounts of the less known fibres will be found to be even more interesting. Though the point is not specially emphasised, yet the descriptions make it clear that many of these can keep their place in the world's market only because their preparation, often a very laborious matter, is carried out by cheap native labour. At the same time, the fact that they are produced in small and irregular amounts, and in scattered localities, makes it impossible to establish costly machinery, either in the place of manufacture, or in that in which the preparatory process is carried on. Since only the laying down of such machinery would make it worth while for planters to grow them on a large scale, it would seem that many of them are destined to diminish rather than to increase in the future. The supremacy of cotton is due not only to the relative ease with which it can be prepared, spun and woven, but also to the fact that the regions in which it can be grown are extensive, and that it had a long start over some of its newer rivals. Dr. Goulding tells once again the story of Whitney's cotton gin and its effects, both on cotton-growing and on the nascent cotton industry of Great Britain. Less familiar to most geographers, probably, will be his account of the new cotton-picking machines. These do not as yet seem perfectly satisfactory, but it is noted that one machine will pick 10 pounds of cotton per minute, or 6000 pounds per day of ten hours. The amount collected by the ordinary negro varies from under 100 pounds per day to 300 or even 350 pounds. If such machines can be adapted to the ordinary plantation,

they would obviate the labour difficulty, the greatest in the way of an extension of cotton-growing in the southern United States.

Among the minor fibres described we may mention "kapok," one of the flosses or silk-cottons, which has lately been brought before the notice of the public owing to the fact that it is much used for life-belts and jackets. It is stated that kapok can support thirty-five times its own weight.

The volume will be found full of facts of much value to the geographer, and it has some good illustrations, to which the attention of teachers of economic geography may be directed.

BOOKS RECEIVED.

From Bapaume to Passchendaele, 1917. By PHILIP GIBBS. With Maps. Crown 8vo. Pp. 384. London: William Heinemann, 1917. *Price* 6*s. net.*

The Eclipse of Russia. By Dr. E. J. DILLON. Small royal 8vo. Pp. 420. London: J. M. Dent and Sons, Ltd., 1918. *Price* 16*s. net.*

Histoire géologique de la Mer. By STANISLAS MEUNIER, Professeur au Muséum National d'Histoire Naturelle, et ancien Président de la Société Géologique de France. Crown 8vo. Pp. vii + 324. Paris: Ernest Flammarion, 1917. *Price* 3 *fr.* 50 *c.*

Tropic Days. By E. J. BANFIELD. With 37 Illustrations. Small royal 8vo. Pp. 313. London: T. Fisher Unwin, Ltd., 1918. *Price* 16*s. net.*

Syria and the Holy Land. By the Very Rev. Sir GEORGE ADAM SMITH, Kt., M.A., D.D., Litt.D., F.B.A. With Maps. Demy 8vo. Pp. 56. London: Hodder and Stoughton, 1918. *Price* 1*s. net.*

Revue du Monde Musulman. Publiée par La Mission Scientifique du Maroc. Tome XXXII.: Les Provinces Caspiennes de la Perse: Le Guilan. Vol. I. Text; Vol. II. Illustrations. By H.-L. RABINO. Royal 8vo. Pp. 487. Paris: Ernest Leroux, 1917. *Price* 25 *fr.*

The Botany of Iceland. Edited by L. KOLDERUP ROSENVINGE, Ph.D., and EUG. WARMING, Ph.D., Sc.D. Part II.: 3. Marine Diatoms from the Coasts of Iceland, with one Plate, by ERNST ØSTRUP; 4. The Bryophyta of Iceland, with 39 Figures in the Text, by AUG. HESSELBO. Medium 8vo. Pp. 348-675. Copenhagen: J. Frimodt. London: John Wheldon and Co., 1918.

Tidal Lands: a Study of Shore Problems. By ALFRED E. CAREY, M.Inst. C.E., and F. W. OLIVER, F.R.S. Demy 8vo. Pp. xiv + 284. London: Blackie and Son, Ltd., 1918. *Price* 12*s.* 6*d. net.*

A Brief Survey of the Political Development of Europe. By F. WATERTON, B.A. (Lond.). Crown 8vo. Pp. 183. London: H. J. Drane, 1918. *Price* 2*s.* 6*d. net.*

A Handbook of Northern France. By WILLIAM M. DAVIS, Sc.D., Ph.D. With many Maps and Diagrams. Foolscap 8vo. Pp. xi + 174. Cambridge: Harvard University Press, 1918. *Price* $1.

Italian Mountain Geology. Part I.: The Piemontese Alps, Ligurian Apennines, and Apuan Alps. Part II.: The Tuscan Subapennines and Elba. By C. S. DU RICHE PRELLER, M.A., Ph.D., etc. Demy 8vo. Pp. 192. London: Dulau and Co., Ltd, 1918. *Price* 5*s. net.* *Presented by the Author.*

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

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THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

RECONSTRUCTION IN EASTERN AFRICA.[1]

By Sir ALFRED SHARPE, K.C.M.G., C.B.

(With Sketch-Map.)

THERE has been much discussion of late as to our future disposal of the ex-German African Colonies. I do not, however, propose to enter into that question to-night. General Smuts, in his paper recently read before the Royal Geographical Society in London, stated our position shortly and clearly when he said: "As long as there is no real change of heart in Germany . . . the conquered German colonies can only be regarded as guarantees for the security of the future peace of the world. . . . The premature or unwise restoration of German East Africa to its former owners might have consequences reaching far beyond the confines of the African continent."

There you have the whole matter in a nutshell.

Moreover, until Germany has returned to its owners every yard of territory she has seized during the war, and paid for all damage done in contravention of treaties and of international law, we can entertain no question of return of any portion of the late German colonies.

Whatever may be finally decided, however, there are certain rectifications in the boundaries of our protectorates in Eastern Africa which may be regarded as essential in any case. When, some years ago, the partition of Africa among the Great Powers took place, delimitation lines of British spheres were too hurriedly agreed on, and mistakes were made in drawing international boundaries. The chance of rectifying some of these has now come, and of this opportunity proper use should be made.

Amalgamation of Eastern African Protectorates.—With regard to British East Africa and Uganda, these two protectorates should be united, and administered by one governor and administrative staff. The existence of the two territories side by side under two governments, with separate

[1] A lecture delivered before the Society in Edinburgh on March 21, 1918.

systems and tariffs, and in some respects different policies, is an anomaly, and causes unnecessary expense and inconvenience. Probably the best course to take regarding the Eastern African protectorates would be to unite all our territory north of the Zambesi and south of the Sudan under one Governor-General, residing possibly at Zanzibar. This united colony would include Uganda, British East Africa, Nyasaland, North-Eastern Rhodesia, the Zanzibar group of islands (Zanzibar, Pemba, and Mafia), and such portions of German East Africa as may finally be permanently taken over by Great Britain. The present meaningless title of "Protectorate" should be dropped, and that of *Colony* adopted.

Frontiers.—As to German East Africa, the first consideration should be the needs of Belgium. The Belgians have contributed largely, and courageously, towards the conquest of this German colony, and, if Belgium desires to adjust the boundaries of her already vast Congo colony, her wishes in this respect should be liberally met. Subject to that proviso, the united territories of Uganda and British East Africa ought to have the southern boundary extended in such manner as to include Ruanda, Usumbura, Urundi, and Bukoba on the west, and Tanga, Usambara, and Kilimanjaro on the east. The Nyasaland Protectorate, incorporated with North-Eastern Rhodesia, requires an addition of territory in the north, to include Kondeland with the regions west of it to Lake Tanganyika. By these new boundaries Uganda, British East Africa, and Nyasaland would recover districts in which British influence formerly was supreme, but which were gratuitously handed over to Germany in the general partition of Africa.

With regard to the territory thus proposed to be returned to Nyasaland, not only was British influence formerly supreme there, but part of it—Kondeland—is ground for which British blood was shed in order to secure the country to the natives against the invasion of Arab slave-traders, and a two years' war was waged with the Arabs (in 1887, 1888, 1889), the history of which can be read in *The Rise of our East African Empire*, by Sir Frederick Lugard; in *Adventures in Nyasaland*, by L. Monteith Fotheringham; and *British Central Africa*, by Sir H. H. Johnston. Kondeland should never have been given up to Germany. As Fotheringham puts it: "The great mass of the Mwambe (the people of Kondeland), who rescued the band of whites besieged in Karonga, and afterwards fought side by side with us against the Arabs; whose country we in turn were the means of saving from Arab aggression; people, in fact, whom we had been amongst for a decade—are handed over to the Germans."

Our ally Portugal might be given the opportunity of extending the northern boundary of Portuguese East Africa to a line drawn from a point north of Lindi, on the sea-coast, to Amelia Bay, on Lake Nyasa.

This still leaves the bulk of German East Africa, including the 800-mile railway from the coast to Lake Tanganyika, the greater part of the eastern shores of that lake, and the sea-coast ports of Sadani, Bagamoyo, Dar-es-Salaam, Kilwa, etc. The precise future of these will, no doubt, be arranged by Great Britain, in agreement with Belgium and our other allies, as circumstances may render advisable.

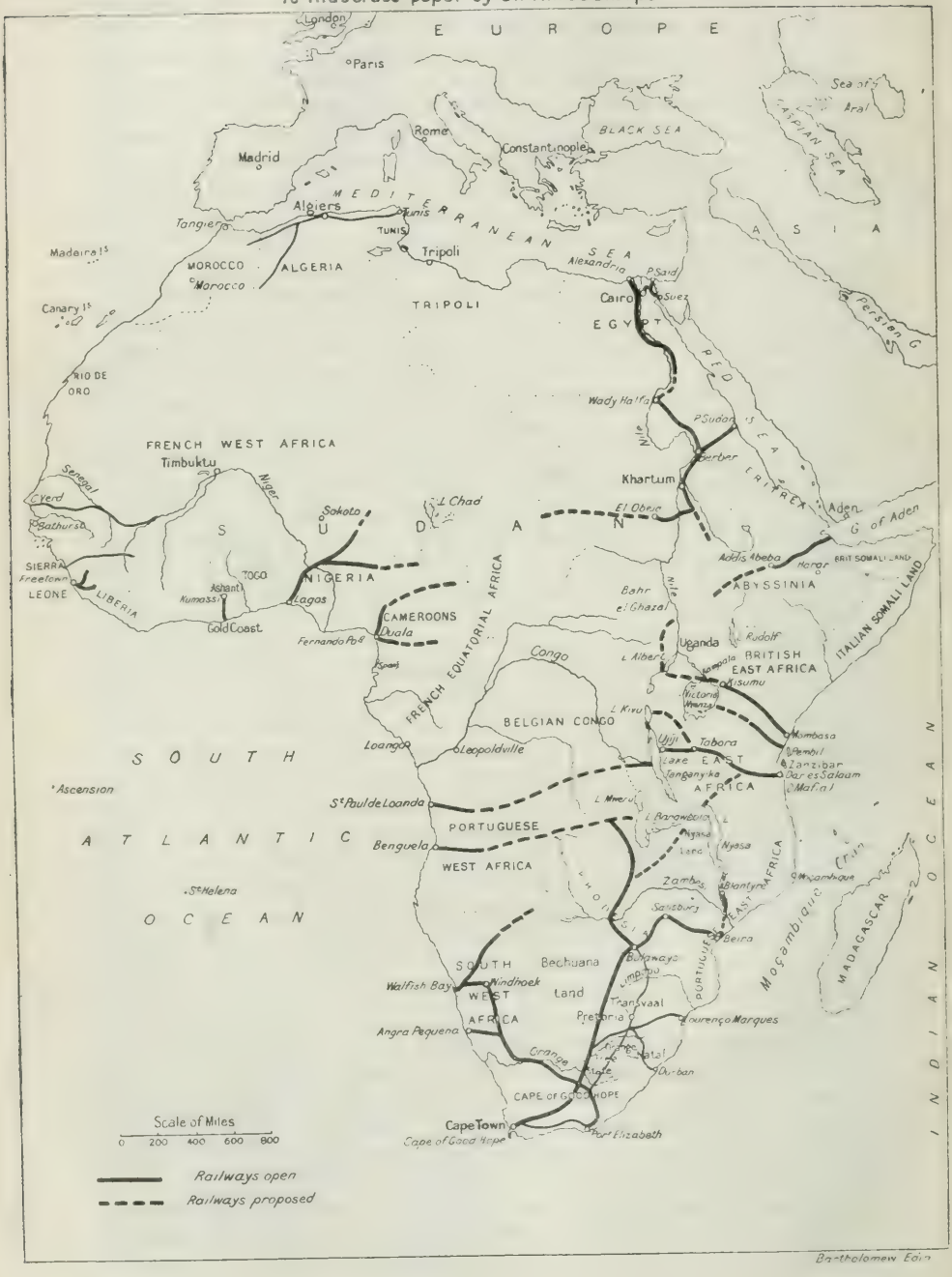
So much for the question of our frontiers. I will now turn to some of the most pressing requirements of our Eastern African territories after the termination of the present war.

Railway Construction.—We have in these tropical possessions some of the richest countries in the world, rich in agricultural products, rich in mineral possibilities. There is one great obstacle in the way of their development—want of communications. No matter how rich a country may be, before it can be developed and export its products it *must* have railways. Roads, and even waterways, are a makeshift. It has been proved again and again that railways in Africa soon pay their way. We could scarcely have a better example of this than the "Uganda Railway," a line which was built by our Government from the Indian Ocean to Lake Victoria. It was constructed in the face of much opposition and criticism. People asked, "What on earth is it going to carry?" Well, when it was commenced we might say there was almost *nothing* for it to carry. In a surprisingly short time, however, it was able to pay its way as well as interest on capital. Strategically, it has been invaluable to us in this war: it has enabled us both to defend our own territory and to invade that of the enemy: it has also provided the means for transporting supplies to our allies the Belgians in the Eastern Congo. It has opened up some of the most charming countries in Africa, and has been the means of initiating a steady movement of settlement and development by Europeans of the healthy highlands reaching from Nairobi to Victoria Lake. Trade has followed the railway. Already the want of a double line is felt, and after the war the supply of rolling stock will require to be greatly increased. The inland terminus is at present at Kisumu, on Lake Victoria, but the line must be continued by a branch leaving the railway near Londiani, running towards the Gwas-Ngishu plateau, and then turning west to Jinja and Kampala, in Uganda, touching possibly, on the way, at Port Victoria. From Kampala again an extension will eventually be necessary, through Toro, to the Belgian Congo frontier, in order to tap the Kilo-Moto gold deposits, which, there is every reason to believe, will prove to be one of the great future goldfields of the world. Uganda also requires more than one short light railway from Kampala or Jinja to serve the cotton and coffee-producing districts of that protectorate, which at present are handicapped by heavy rates of transport. In order to tap Ruanda and the country surrounding the romantic Lake Kivu, there is a choice of three railway routes: (1) From the south end of Kivu to the north end of Tanganyika (80 miles only), which latter lake is already served by the Dar-es-Salaam—Ujiji line; (2) from Kivu through Ruanda and Bukoba to Lake Victoria; and (3) from some point in Ruanda to Tabora. The first would be the least costly, and would meet present requirements. Both east and west of Kivu there is a large extent of splendid country; on the east lies Ruanda, a charming district, with a fine climate, full of cattle. It ranges from 6000 to 8000 feet above sea-level, and consists of hills covered with short, sweet grass and bracken.

West of Kivu you can travel through similar country for three or four days' march, and then you run up against the wall of the Equatorial

MAP OF RAILWAY SCHEMES IN AFRICA

To illustrate paper by Sir Alfred Sharpe



Bartholomew Edin

Congo Forests. In a few yards you slip out of the open country into the dark, damp gloom of the forests, where sunlight never enters.

At the northern extremity of Lake Kivu lies the volcanic region of the Mufumbiro Mountains, some of the peaks of which reach to nearly 15,000 feet. It has been suggested that these are identical with the "Mountains of the Moon," supposed by the ancients to be situated at the sources of the Nile. As a matter of fact, the two remotest sources of that great river do rise at the bases of the Mufumbiro volcanoes—the Kagera River flowing to Victoria Lake and the Ruchuru River to Lake Edward.

A railway will be needed from Kilossa or Mrogoro (on the Dar-es-Salaam—Ujiji line) to the Kondeland district, near the north end of Lake Nyasa. This magnificent country, which rises to elevations of over 8000 feet above sea-level, has a rich volcanic soil, produces cotton, coffee, many African products, and European fruits, has a good climate, and is well suited for colonisation by whites.

Nyasaland was the first Protectorate to regulate itself on a sound business footing by making its revenue equal its expenditure. It was the first to establish a permanent export of its own products (coffee, cotton, tobacco, tea, chillies, etc.), and the first to be opened up by resident European planters and farmers (mostly Scotsmen).

The country has a railway, about 180 miles in length, built by private enterprise, running from Chindio, on the left bank of the Zambesi (at what was once considered the head of navigation on that river) to Blantyre, the centre of the Shiré Highlands, the chief planting district. This line taps neither the sea-coast nor the shores of Lake Nyasa. It has long been intended to extend it both north and south; in the former direction to Lake Nyasa, in the latter to the coast port of Beira, in Portuguese East Africa. These extensions are urgently needed, and their construction should not be longer delayed. If they had been made before the war it has been estimated that the cost would have been almost recouped by the sums spent in maintaining military communications between the coast and German East Africa. The entire line, when completed, will open up a route of cheap rail and deep-water communication from the coast to the north end of Lake Nyasa, a total distance of 800 miles. From some point on the Nyasaland Railway another line is needed branching off to the north-west to serve North-Eastern Rhodesia.

The German railway from Dar-es-Salaam is another instance of very rapid trade and general development caused by railway construction. To hold these African territories and not to develop them is a purposeless policy. They can produce, in addition to ordinary trade products, unlimited quantities of foodstuffs—maize, beans, oil, grain, and so forth, and if the war has shown one thing clearly it is that we require to increase food production within the Empire.

Let us hope that after the war is over, whatever economies we may have to enforce, these will not take the form of stinting the means to develop the immense resources of our tropical African possessions.

Representation in London of African Colonies.—In future Eastern Africa,

together with our West African Colonies, should have some more direct and effective form of representation at home than exists at present; possibly by the creation of a "British African Council"—such as has been more than once suggested. Our home system of dealing with Colonial affairs is ineffective for various reasons. It is improbable that a Secretary of State for the Colonies for the time being knows much about our possessions abroad: he is Colonial Secretary to-day, yesterday he may have been at the Board of Trade, to-morrow perhaps Secretary of State for India: he is only a figure-head, and cannot be omniscient, and the result is that everything falls to the permanent officials. The permanent Under-Secretary, on the other hand, has such an enormous variety of entirely different conditions to deal with, affecting all our colonies and protectorates, and is so fettered by financial considerations, that it is obviously impossible for him to deal efficiently with the many vital African questions which arise, or to provide the money needed for development.

Native Taxation.—This should be *unified* as far as possible throughout Eastern Africa. At present, not only does the extent of this impost vary in different territories, but the systems adopted are themselves on different lines. In Nyasaland more than half the revenue is contributed by the native hut tax. It is often stated, and on quite good grounds, that the native is the greatest gainer of all by our institution of good and just government in countries where formerly there was no law but that of might, and that it is only proper he should contribute towards the cost of government by a special direct tax, bearing in mind the fact that indirect taxes do not affect him so much as the immigrant European. Native life in our more or less civilised African possessions of to-day, however, is not what it was twenty years ago: and we might well have a general careful reconsideration of the whole question of direct native taxation, with the view, at any rate, of adopting a uniform system throughout our territories.

Representative Government.—In British East Africa there has been developing, for some years past, a movement on the part of colonists for obtaining a larger measure of representation in their own government. In the early stages in tropical Africa there was no better form of administration than that of the out-and-out Crown Colony—an autocracy. There has now been so much development, and the number of European settlers in Eastern Africa has so greatly increased, that the demand for effective representation is a reasonable one. Especially in such questions as the framing of native policy and land laws do our colonists consider that they have the right to be heard. In British East Africa, Uganda, and Nyasaland, much capital has been invested by British planters, farmers, and traders, and many industries have been started. There is ample material to draw upon for an independently elected legislative body—to be endowed with genuine powers. So long as a country is governed by an executive which is purely official and a legislative body of which all, or the majority, of the members are appointed by Government, it cannot be said with reason that independent colonists have any real say in the affairs of the country of their adoption.

Military.—There is no part of the British Empire which has contributed more generously, in proportion to the European population, towards filling the ranks of the army than Rhodesia, Nyasaland, British East Africa, and Uganda: in addition to which, all these protectorates have rendered invaluable help by the recruitment of native battalions for service in German East Africa. Events have shown that we have a valuable military asset in these countries in our native soldiers, and fears have been expressed in some quarters that the increase of "militarism" in Central Africa may constitute a future danger. Owing to Germany having trained and armed for military service large numbers of the natives of her East African colony, she was able immediately on the commencement of hostilities to place a big force in the field, and it became necessary for us to greatly expand our own native regiments.

If—after the end of the war—we no longer have Germany as a neighbour in East Africa, our native forces should be largely disbanded, and reduced to the small limits required for ordinary purposes. If, on the other hand, for one reason or another, it should be our misfortune to still find ourselves alongside her, we cannot take that risk—at any rate until we are satisfied—satisfied not by words only that Germany is taking the same course as we would desire—disarmament.

Disposal of Crown Lands.—Hitherto there has been no uniform system in the various protectorates of dealing with Crown lands, or "waste" lands, nor does there seem to have been any common policy as to their disposal. When Nyasaland originally was taken over by the British Government, one of the first urgent matters awaiting settlement was that of a large number of claims advanced by Europeans to have bought land from natives and their chiefs. These were gone into, decisions arrived at, and freehold titles given for such areas as were awarded. All the rest of the land in the protectorate was taken to have passed to the Crown under numerous treaties made with chiefs and their headmen and people. Since then, up to 1912, the policy adopted was that Government stood in the place of the chief, and that one of its first duties was to see that there was reserved a plentiful supply of land for all possible native requirements throughout the country. Subject to this proviso, Government sold land in comparatively small blocks to incoming settlers and farmers on reasonable terms, giving freehold titles (or leaseholds, if desired). The conditions of purchase were not onerous and were such as to encourage settlement. The purchase of large blocks for speculative purposes was absolutely vetoed. Under the system *now* in force in Nyasaland no freehold titles are given. Leases only are granted:—

(*a*) For ordinary purposes for any term not exceeding 21 years.

(*b*) "For the purpose of planting a slow maturing product" for any term not exceeding 99 years.

In either case, provision is made for a "reassessment of rent" by Government after the expiry of one-third of the term, and again after the expiry of two-thirds of the term.

In the early days of the British East Africa Protectorate, very large areas of land were disposed of to purchasers who held them for speculation; later on this policy was abandoned and the opposite extreme now in

force in Nyasaland adopted, *i.e.* no freehold titles at all, only leaseholds.

This is not altogether a system that commends itself to the would-be colonist, to whom one of the great inducements for self-banishment to an inaccessible region of the world is that he may benefit by the development which he himself and his fellow colonists are instrumental in carrying out. The idea that the fruits of his own development and the improved value of the land he cultivates should go to the Crown does not appeal to him. A colonist as a rule *wants* a freehold title; he looks forward to making his profits by planting, farming, or what not, and then selling and retiring. If his holding is for a term only, he is fettered all round; he shirks permanent improvements; and the value of his property, owing to the decreasing limit of the term, is possibly always decreasing in value instead of increasing.

In Uganda, on the other hand, the view adopted by Government, I understand, was that all the spare land belongs to the chiefs. There never was anything in Native Africa, so far as I have seen, in the shape of the holding of definite blocks of freehold land by individuals, the actual condition being that a big chief, or king, held a country so long as he was powerful enough to keep it, his sub-chiefs settled with their people on separate portions of it, and the village headmen arranged among themselves rough limits for cultivation by their people. It would be too dangerous a proceeding to allow chiefs to sell wholesale what they chose to Europeans; and, naturally, they have to be controlled by Government. If the principle adopted be that the land belongs to the chiefs, it is, I consider, essential that Government, for the protection of the great bulk of the native population, should take in hand the entire *regulation* of all dealings in land. If it is considered right to allot a portion or all of the purchase money, or rents, to the natives this should be done, not in large sums to the chiefs themselves, which would be (and are) spent in foolish, extravagant, and wasteful expenditure, but in such manner as will ensure that the real bulk of the native population benefits.

These very brief notes as to the diverse policies on this all-important land question in our various protectorates will, at least, show the need for a careful study of the matter in all Eastern Africa.

Native Education.—The question of native education should be more energetically taken in hand, and a suitable scheme adopted by Government applicable to all the protectorates. In Nyasaland the whole of this important work is at present done (and very well done) by the missions, who receive a small grant from Government in recognition of the services they are rendering. I understand that in the other protectorates no comprehensive system of native education has yet been formulated.

Native Labour.—There is another big outstanding matter in Africa—labour. All tropical countries need a supply of native labourers to undertake work which cannot be done by Europeans. In the absence of a reliable supply, development is difficult. There is a great variety of work which is not only impossible for whites in the tropics, but

which cannot be dealt with by machinery of any kind. The greatest asset of a tropical country is a large native population.

In Eastern Africa, as a general rule, we have a considerable native population, who, however, are not always anxious to undertake a large amount of work for Europeans—though conditions vary in the different protectorates. The African can secure the necessaries of life and supply his modest wants so easily and by the expenditure of so little effort, that he sees no object in working too hard. We do not allow directly, indirectly, or under any guise whatever anything in the shape of compulsory labour. We consider that a condition of indolence is, however, unsatisfactory, and that all men should contribute towards the development of the country in which they live. What inducements, therefore, can we offer to African natives? First, we have in one shape or other, a moderate direct native impost such as a hut tax or a poll tax, the money for which has to be earned; next, we endeavour to create new wants, clothes, ornaments, manufactured goods and luxuries of all kinds. This is a gradual process, as the native is conservative by nature and slow to adopt new tastes and ambitions. We try to educate him up to higher ideals, and to instil into him our own view that man should not be satisfied with mere existence like the beasts, but should adopt civilisation and what we consider to be the general ideas of a civilised life. We want him to *produce* something of use to the world—whether he produces it by labour done for an employer, or on his own account, is immaterial. None of our protectorates should encourage the emigration of native labour. What we need above all, however, is *one* Native policy throughout Eastern Africa in all matters concerning native labour.

Shipping.—Up to comparatively recent times the shipping trade of the East African coast was in German hands. The "Deutsche Ost Afrika" Steam Shipping Company, controlled by the Woermann group, and aided by a generous subsidy from their own Government, gradually mopped up almost the whole of this carrying trade. They went into it on business lines, spared no expense, put on fine ships, and provided small cheaply-run coasting steamers and sea-going barges to collect local trade and transport it to various centres—Dar-es-Salaam, Mombasa, Mozambique, and Beira. They gradually choked off all serious competition, and for a time our Eastern African possessions were practically dependent on the German line. It was frequently urged that this was a humiliating and very inadvisable condition of affairs, but the British Government for long did not see its way to take effective steps to help our own shipping lines, and allowed the whole trade to fall into German hands. Eventually, as the volume of this trade increased, the Union Castle Company came in, and, to their lasting credit—in the commencement at a heavy loss—they established a regular line of steamers from England to East African ports. When the war is over, when Germany will be straining every nerve to regain her lost trade, a British line for the East Coast should be subsidised by us to at any rate as large an extent as any German line, and should be given every assistance to ensure that this trade, direct and coastal, remains in British hands. Let there be no

misapprehension on our part as to the action of Germany after the war in the matter of trade recovery. We know what powers of organisation that nation possesses, and it is certain that she will immediately set to work on lines already prepared and laid down. An interesting document recently fell into the hands of one of my Portuguese friends, a confidential paper by a leading German merchant, at present a refugee in Spain, drawing attention to the great value to Germany of the trade of the Portuguese African colonies, and outlining the methods to be adopted for recapturing and retaining this trade. Are we already preparing *our* line of action?

Missions.—In the notes for my address to you to-night there were a number of other subjects of interest in connection with Eastern Africa after the war, but I have found that the consideration of these would lead me to take up too much of your time. There is, however, one matter on which I cannot refrain from saying a word, to a Scottish audience—the work accomplished, and to be taken in hand in future, by missions. There are many missions of different denominations in Africa, and perhaps comparisons are odious, but I must say that I know of no more excellent work than that of the two Scottish missions—the Established Church and the Free Church, under Dr. Hetherwick and Dr. Laws. Your missions work on sensible, practical lines; they compel respect from the native, do not pamper him, and, above all, instil into him the principle of taking up some description of work for the betterment of himself and his own country. A great work lies ahead for missions; they require to adapt themselves to existing conditions, and to realise—as your societies are doing—that in addition to purely religious instruction, an opportunity lies at hand to conduct the general education of the native on sensible lines, and by *industrial teaching* especially to place within his reach the means of becoming a useful member of society.

Generally.—As regards the future and what we may call "reconstruction," we should take this opportunity of endeavouring throughout our Eastern African possessions to *consolidate our policy* and to *unify our systems*. A vast amount of native reconstruction will be required after the termination of hostilities. German territory will need a lot of "smoothing down." Native life will have to be re-established after the demoralising effects of a long-continued condition of savage warfare. Many thousands of natives who have been employed either as actual fighters or in work connected with war will have to be resettled in their old villages or in new ones. The thousands who have been barbarously treated by German military forces, and who have in many cases lost all they possessed, whose women and children have been scattered, and whose homes have been destroyed, will have to be provided for. Our own territories have suffered heavily, plantations of coffee, cotton, and other products have had to be left more or less uncared for, owners having joined the military forces. Much of the tobacco, cotton, and other crops grown in Nyasaland has been lost owing to the inevitable shortage of shipping facilities. Our colonists must be generously dealt with by Government, in every way, in order that they may rebuild and

re-establish British industries to which they have devoted their lives and energies.

Money will have to be provided for railways, roads, and other public works. New industries, which have received such a sudden check, will have to be fostered, and if necessary assisted financially, while perhaps, above all, the question of the wants, education, and general requirements of our native subjects will require to be carefully considered and dealt with throughout Eastern Africa.

SOME ASPECTS OF THE INDUSTRIAL REVOLUTION IN WESTERN EUROPE.

By Marion I. Newbigin, D.Sc. (Lond.).

All the chief states of the world, with the partial exception of China, have been profoundly influenced during the last century or so, by that great series of economic changes to which the term Industrial Revolution is conveniently applied. The effects of these only manifested themselves slowly, and were far from occurring simultaneously throughout the civilised world, so that it is impossible to assign an exact date to the industrial as we can to political revolutions. Nevertheless, there are a few outstanding events which it is well to bear in mind in discussing the subject, for they indicate at least the starting-point of the new conditions.

Note first that, put in briefest form, those changes in industry and commerce which were so profound as to merit the name of Revolution were two in number. In the first place, the power of production was suddenly and enormously increased. Second, such improvements were made in means of transport and of communication, that, compared with older conditions, space seemed to be almost annihilated. Increased production first manifested itself in the textile industries, and depended upon a whole series of inventions, which reacted strongly upon each other. Hargreaves invented his spinning-jenny in 1764, and patented it in 1770: Arkwright patented his water-frame in 1769, and Crompton his mule in 1779, while Cartwright's power-looms were patented in 1785 and 1787. Watt was working at his steam-engine during almost the same period (1769-82), and Whitney's cotton gin, which for the first time permitted raw cotton to be put upon the market in large quantities, was patented in America a few years later, in 1794.

The great improvements in transport were, of course, due to railways and steamships, themselves depending ultimately upon Watt's steam-engine, and the use of coal. The first steam-railway for general purposes, it will be remembered, was the Stockton-Darlington line, opened in 1825. The first practically successful steamboat was Symington's, patented in 1801, though it was some years later before the problem was really solved economically. The utilisation of the

force of electricity in telegraphy by wire post-dated railways by about twenty years.

Broadly speaking, then, we may say that the inventions which made the industrial revolution possible were worked out in the latter part of the eighteenth and the early part of the nineteenth century. Now the outbreak of the great war marked the definite close of a particular period of human history. What the future holds we do not know; but it is at least certain that the world to which peace comes will be in many respects a changed world. It is thus possible now to look back upon what we must regard as at least the completed first stage of the industrial revolution, a stage which may be regarded as lasting for the hundred years between Waterloo and Serajevo. It is proposed here to consider some facts connected with the different forms which the process of industrialisation took, in this country and on the continent, throughout the period, and to discuss them in relation to geographical conditions and to the war: to the war, for it would almost seem as if the great conflict was as inevitable a consequence of the industrial revolution as was the Terror of the French one: to geographical conditions, for not only has industry been everywhere influenced by place relations, but the avowed purpose of the Allies, the defence of the small nationalities, is based fundamentally upon a geographical conception.

In order to keep the survey within reasonable bounds we shall limit ourselves to the three countries of Great Britain, France, and Germany. The United States are left out of consideration because the conditions there were complicated by a number of factors which do not present themselves on this side of the Atlantic. Among these were the existence, during the period, of vast areas of virgin lands, which gave, with the help of the new forces of machinery, a capacity for surplus food production on a scale of which the world had had no previous experience. Another special feature was the almost limitless supply of adult immigrant labour, unorganised, unspecialised also in most cases, to which the Old World offers almost no analogy. No analogy on the same scale, that is to say, for Germany in the years before the war was demanding and obtaining cheap and unorganised Italian, Polish, and Russian labour in a somewhat similar fashion.

Beginning with Great Britain, the first and most obvious point, and one that has been often emphasised, is that this country for a long period led in the process of industrialisation. The cause was in part historical, for the period at the end of the eighteenth century and the beginning of the nineteenth, that which saw the development of the great inventions, was one of great turmoil on the continent of Europe. Our insular position enabled us, despite our participation in the Napoleonic wars, to obtain a start in the establishment of factories. During the same period, the United States formed a new, still thinly peopled country, not ready for industrialisation. Further, the position and abundance of our coalfields, the ease with which the coal could be won, our predominance on the seas, and the inventive genius of the British people, were all factors of importance.

The iron industry in any country is often taken as an index of the

industrial and commercial status of that country. Judged by this standard, the most striking feature of the years preceding the war was the fact that this country had definitely lost its supremacy. In 1890 the production of iron and steel in the United States for the first time surpassed that of Great Britain. Ten years later, in 1900, the lead of the United States had become very marked, while the production in Germany nearly equalled that here. By 1910 Great Britain had definitely fallen into the third rank. Clearly, then, if during the first two-thirds of the period under consideration the dominant fact in industry was the supremacy of Great Britain, during the last third it was the rise of the United States and Germany into the front rank.

Let us look next at the special geographical conditions which have influenced the course of industrialisation in England. The first and most obvious point is that the coalfields, and thus the areas best suited to industry, are remote, so far as the small total area of the country allows, from the old national centres. Placed on the margins of the uplands, both northern and western, they lie in areas which had not previously counted for much in the national life.

Mr. Edward Hutton, an author to whom the Old and Merry England of pre-industrial days makes a strong appeal, has suggested that the real England is the area south of a line between the Thames and the Severn. The statement is extreme, from any point of view: but we may admit at least that the England of tradition, the England of the Elizabethans, the region which saw the fine flower of our literature, in which wealth was stored, where a state of well-being for a certain proportion of the community was possible, was the England of the scarplands and the plains. This fact was deeply implanted in the minds of the community —so deeply rooted that even to-day all the experience of the material wealth to be won on the coalfields has hardly eradicated it. At the time of the outbreak of war the richer members of the new industrial communities were just beginning to evolve a tradition of their own, putting out roots, as it were, in the new soil.

The fact that London is at once the repository of the national traditions and ideals, and, under the new conditions, a city of commerce rather than primarily of industry, has, of course, accentuated the power of the older ideals to make a stand in the face of the new. An American author has said that one of the facts which strikes his countrymen most, when they come to make pilgrimages to old world shrines, is that the great publishing houses of London, whose names are world-famed, are mostly lodged in what an unkind observer might describe as slum dwellings—certainly not in magnificent sky-scrapers! The fact is perhaps suggestive of much—of among other things, a certain south country contempt for the display of wealth, a conviction that that is better suited for the new cities of the coalfields than for a metropolis with an ancient tradition.

It seems at least true to say that England, despite what some would call her early infection with the virus, has never become completely industrialised. Even in her industries, her younger competitors recognise something of the haughtiness of the *vieux monde* in face of "up-to-

date" methods. Thus, as contrasted with the old gibe at a nation of shopkeepers, it is curious to note that a recent French author, M. Engerand, contrasting English with German industrialists, describes the former as "vrais gentilshommes de l'industrie," who "exploitaient leurs mines et forges en *gentlemen farmers*" (*L'Allemagne et le Fer*, pp. 220 and 221).

In Scotland the conditions are somewhat similar, for the traditions of the east, based upon the occupation of fertile agricultural lands, and upon an old connection with the continent, and centring round Edinburgh, have maintained themselves as against the new wealth and the new strength of the west, centring round Glasgow.

This conviction that national and individual well-being come from the land is, of course, all but universal in old states, and not peculiar to Great Britain. But the course of industrial development here was profoundly influenced by our sea-power, and, associated with this in origin, the holding of overseas possessions in climates suitable for European settlement.

As to the first point, our splendid ports, our seafaring population, our geographical situation, made it possible to develop foreign trade on a large scale so soon as the new factories furnished material for exchange, while those factories in their turn could only be fed by raw material brought from a distance in British ships. The seafaring instincts, again, combined with the great development of shipping, meant, as it has meant throughout our history, an absence of insularity. The dangers of limitation to a small island were corrected by free intercommunication with the wide world, and that free intercommunication brought tolerance, practical common sense—what Naumann, in his *Mitteleuropa*, calls the Englishman's elasticity, his calm adaptability, his unshakable self-confidence. Our dominance on the seas has diminished, in short, the risks of narrow outlook due to life on a small island, by giving us a world environment in addition to the limited local one.

The constant swarming-off, during the period under discussion, of the young and energetic members of the community to the new lands across the seas, has had precisely the same effect. Both have checked the tendency to become intoxicated by the new power which machinery gave to production on a hitherto unprecedented scale; have given us other interests, other capacities also, than that of mere production.

Just as through all the period under consideration, the young man who rebelled against following his father to the mill, the factory, or the counting-house could always "run away to sea," so also he would throw off the yoke of tradition in another way, and begin life for himself in a new world. But—and this is the essential point—his departure was not really a breaking of ties. In that new world he was still linked to the old by a bond whose strength lay in its looseness. No necessity was laid upon him, as upon the German in the United States or the Argentine, to make a definite choice between the new and the old; his departure strengthened rather than weakened the mother country, and the fact that at home the door was always open made for a freer life there. In Germany, says Naumann in his most suggestive chapter on

the industrialised peoples of Germany, "a strong net is woven round the individual." To him the ideal is that the net should ever be woven tighter and tighter. "The insertion of the individual ego into the joint ego is our special ability" (*Central Europe*, English translation, p. 116). Here, on the other hand, the individual has always been able to slip through the meshes of the net, and the specialisation of the individual has reacted strongly upon the community.

But though from one point of view the phenomenon of emigration has meant the escape of the individualised, from another it has been necessitated by the intermittent presence of a surplus population. For, though it may not perhaps be obvious at first sight, the great increase in production due to the industrial revolution has affected population as well as goods. Over production, of which we shall have to say something in a moment, has tended to occur in both cases. The decay of agriculture, due partly to the enclosure system, partly to industrialism, and partly to the development of the virgin lands overseas, also tended to produce a surplus of labour which had to find an outlet.

It is a familiar geographical deduction that, in the East, rice-growing tends to be associated with a dense agricultural population: for the more rice is grown the more people can be fed, the more children born the more rice can be grown. But the same thing is true also of industry, which both demands and supports a large population. Both in England and Scotland the increased population of the coalfields was obtained by attracting agricultural labourers, at first from the poor lands, where there was a natural surplus of labour, and later from a wider area. But this primary source of supply would not have been sufficient without an increase in the birth-rate. In the early days, before factory legislation, child labour was, of course, extensively employed. Now whereas on the land a youth could not hope to marry till he had attained a man's strength, in the factories strength and maturity were of less significance, and since men, women, and children were alike wage-earners, early marriage, with prolific child-bearing, and many attendant evils, became the rule. In other words, the necessary increase in the population to enable the change from a predominantly agricultural community to a predominantly industrial one to take place, arose in the country itself. As we have already stated, this was not the case in America.

Logically, it might seem that once caught in the industrial net in this fashion there was no escape. The new factories could produce thousands of yards of cotton cloth, the new rolling mills thousands of tons of iron rails. But for the task of production thousands of operatives were necessary, and if these were supplied, then they could be fed by food brought across the seas from the virgin lands in the new steamships, paid for with those cotton goods and iron rails. The social conditions multiplied the labourers as the industrial conditions multiplied the goods: in both cases over-production was always liable to occur, with consequent poverty and misery.

That this self-adjusting mechanism did not end in a crash in this country during the period of her lead was probably, as we have sug-

gested, partly because there was more than one way out of the net, and partly because the old tradition made a bold stand in the face of the new. There was here a constantly repeated and constantly increasing revolt against the notion that man's mission in life is to produce cotton and iron goods, to sell them, and to beget many children to produce and sell them in their turn. To the young people of the successive generations, and more especially to those born in families where the old tradition of poverty and narrowness of life had faded, came always the question *et après?* When the cotton is woven and the ships built, what next? Does continued production alone bring the satisfaction which all living things seek in life?

In the years before the war this silent and unnoticed revolt was being steadily stimulated by the phenomenon of over-production, which, in so far as it affected goods, was taking on a new form.

In the earlier days, more especially while Great Britain remained the only great industrial nation, the world's power to absorb seemed to keep pace with, or even to exceed, industrial production. Over-production then seemed, and perhaps was, a local condition due to inadequately organised transport, to the fact which we have already noticed that improvement in transport and communication lagged quite perceptibly behind improvements in the machinery of production. Thus many maintained that the customers existed somewhere, and that it was only a question of reaching them. This led again, in the fulness of time, as the near markets became exhausted, or were protected by the individual states in the interests of their own developing industries, to the search for colonies, as regions wholly unindustrialised, but capable of furnishing markets and raw material for new manufactures.

But there is another aspect of over-production also which was implicit in our contemptuous phrases of "made in Germany," and "Brummagem goods." Man had acquired a new skill, a new technique. Employed legitimately enough at first in making with increased ease, and at a reduced cost, goods of which the world will always have need, it was being increasingly used in the manufacture of objects with no particular use and no special beauty. If Germany was employing the skill and patience of her workers in such forms of activity to a marked extent, yet we must not forget that we had for long been doing it also, if on a smaller scale. The war, said a French newspaper writer in a passionate outburst in August 1914, was started by Germany in order to force the world to buy the "pacotille" which her factories turn out yearly in thousands of tons. But in this, as in some other respects, Germany was only carrying out to their logical conclusion principles of action which other nations had been practising before her. The soulless machines everywhere were turning out automatically necessities and useless rubbish on a vast scale. New operatives were wanted to produce, new markets to absorb, and the world as a whole moved steadily, though with a different momentum in the separate states, towards the great catastrophe.

But if over-production, and the consequent rivalry for markets, was one of the causes of the catastrophe, there was another, less obvious, but in some ways probably even more important. This depends upon the

development of steamships and railways, and the utilisation of the new force of electricity, which enabled man to transport goods in a hitherto unknown fashion, to communicate almost in a moment with the uttermost ends of the earth. The effect was, apparently, to emancipate him from the control of his immediate environment, to break the bonds which had previously linked human groups to the physical conditions under which their lives were passed. But it is this link which maintains—perhaps even produces—the individuality of the separate groups. Just as among animals specific differences, however they arise, seem to be preserved by environmental differences, so individuality among nations and communities is closely linked to the differences in soil, in climate, in productions of the areas which they respectively inhabit.

Before the war we were witnessing the development of international capitalism and, as the mirror image of this, that of international socialism. To the biological warning that survival depends upon the capacity for variation, itself controlled by local environmental conditions, and arising in response to them ; to the warning of the artist and creative thinker that it is not the citizen of the world, but he who can absorb and transmute *local* impressions who is the producer of that which is distinctively human, both turned a deaf ear. Both for different reasons, and by different methods, were striving to break down the old national dividing lines, to eliminate the effects of local environment. Both were preparing the way for the great attempt to establish the hegemony of the world.

If the notion that human life was losing its old local basis was spreading fastest in Germany, it was obvious elsewhere also. In Germany some of the effects were visible in, for example, the great city of Munich, where wealth was being spent on an "art" which consisted in a servile copy of the art, especially the architecture, of another nation. In other parts of Bavaria, also, an old peasant industry, which had originated *in situ*, was being replaced by a wholesale manufacture of toys which combined a crude barbarity of conception with much technical skill. Whole communities were contentedly engaged in producing monstrosities which satisfied no natural instinct in their makers, and were calculated to inflict irreparable injury on the taste of the children for whom they were intended.

It is here that we come, by way of contrast, to the special feature of the life of France. In our own country, because of our control of the seas, and our extensive foreign trade, the bond of local place relations has been loosened, though to a less extent than in Germany. France, with a far larger area, a greater variety of climate and soil, has always had better marked local groupings. With a much lower degree of industrialisation, a far less developed foreign trade, these local relations have been less modified.

It may be true, as has been stated, that a French Minister of Education can take his watch from his pocket, and say,—At this moment every child in France is engaged upon such and such a task. But if he were wise, he would add that, when work is over, each child will go home to a house and a meal both equally stamped with the print of the local

place conditions. Secure in the unifying effect of Paris and its ideals, the French are able to allow these local conditions to exert their full effect. They realise clearly that the nation's life is richer, not poorer, when national patriotism is based upon local patriotism, that a man should be a citizen of his "pays" first, and of his country second, that he should contribute to the whole an individualised strand. And are not French literature, French art, French influence upon the world, evidence that they are right?

If we drank of the new wine of industrialism early, and have had time for the most part to learn that it does not suit all palates—that it is a dangerous draught for the docile, and arouses strong revolt in the highly individualised, it is the great gift of France to the world that vast tracts of her country have felt no desire to drink at all, have preferred the produce of their own vineyards and orchards, their Norman cider, their Burgundy, the vintages of Provence and of Languedoc. It is a good omen for the future, also, that the two countries should be united at the moment in the attempt to defend the small national entities, to resist the great attempt to standardise the world.

Let us turn next to a consideration of the effect of industrialisation in Germany, and its bearing upon the state of mind which produced the war. Here we shall rely chiefly upon the statements contained in Naumann's *Mitteleuropa*, which has been already reviewed here,[1] and is as remarkable for its candour as for its ability.

In discussing Naumann's views it may be well to dismiss from our minds, so far as may be, all thought of the barbarities which have marked the German conduct of the war. These barbarities have been, almost without doubt, deliberately ordained by the military caste, and that in the hope of intimidating the neutrals and the weaker allies. At home, dealing for the most part with docile, easily-cowed peoples, the ruling powers in Germany have found brutality profitable. They assumed that it would prove a useful weapon also against peoples of stronger individuality, who had enjoyed a long period of freedom. In this they were wrong: but as the path upon which they had started is one in which it is difficult to turn back, they have gone on, hoping always to find sooner or later the ultimate frightfulness destined to cow the world. So far their methods have stimulated resistance instead of crushing it, and have thus failed lamentably in their purpose. But it should not be forgotten that if, for the nations as well as for the individuals in each, it is the German atrocities which afford the strongest argument for continued resistance, that which gives strength to the spirit when the weak flesh quails, yet there is something to fight against behind and beyond the atrocities.

Had the German Military Staff adhered to the Hague Convention, instead of violating both it and all the natural human instincts at every turn, there would still, as Naumann quite clearly if tacitly recognises, have been grounds for revolt against the doctrine which she wishes to impose upon the world. The very fervour of his appeal to Austria-

[1] *S.G.M.*, xxxiii. p. 83.

Hungary, the frankness with which he sets forth the anti-German point of view, is an acknowledgment that, within the Hapsburg monarchy, no less than elsewhere, there are those who are strongly revolted by the modern German ideal. This ideal, in may be repeated, is the watchword of the industrial revolution carried to its furthest logical conclusion. Using to its full the analogy implied in the word Revolution, we may say that while the leaders in this country have always tended to be Girondists (or "gentilshommes d'industrie"), the later German industrialists belong to the Mountain—are extremists rather than moderates—and so far they have carried their countrymen with them.

But both parties, Extremists as well as Moderates, are represented in other countries as well as in Germany, and in considering Naumann's opinions it is well to forget their immediate application to Austrians and Hungarians, and to consider them as a general exposition of the extreme position. He himself, be it noted, with great simplicity, indicates that if Austria-Hungary can be *persuaded* to attach itself firmly to a Central European Federation, other recalcitrant nations can be readily *compelled* to come in. Naumann is frankly making a bid for world supremacy for Germany—"We shall enjoy our golden age, as other conquering nations in other ages and with other abilities and excellences have done before us. Our epoch dawns when English capitalism has reached and overstepped its highest point . . . Germany, foremost in the world!" (p. 123).

This is definitely an ideal, and one ideal can only be overthrown by another. Is the world destined to be subjugated by German industrialism, which implies an entire suppression of individuality, of personality, of the effect of local place relations, and thus of nationality? If not, how can individuality be preserved? This is the essence of the problem.

In his chapter, entitled in the original "Das mitteleuropaeische Wirtschaftsvolk," translated as "The Economic Life of Central Europe," Naumann begins with a sketch of life in North and Central Germany during the eighteenth century, before the beginning of industrialisation. The description, broadly speaking, follows lines similar to those which would be followed if the account had referred to the poorer parts of this country, and need not be summarised here. The change from that condition to the present one Naumann ascribes, in characteristically German fashion, to compulsory education. "Something developed in them [*i.e.* in North and Central Germany] which in course of time was to outdistance in method and efficiency the already existing capitalistic civilisation of earlier growth; a homely skill in the popular ability to transform dreamers into workers by the aid of letters and memory exercises" (p. 112). We say characteristically German, because it is obvious that the first essential of the transformation was the invention of the machinery which was to give the workers their new power of production. But the great inventions were largely British, and are therefore left out of account in the text.

The result of the transformation was the development of the

specially German method of work—"the transition to the impersonal capitalism of the second stage." Naumann devotes some space to elaborating this point, using a number of illustrations, some of which have been already widely quoted in this country. He speaks of the special German characteristic as "organising ability," but he means more than this, for he says frankly that to the non-German the special German type means "the death and surrender of the individual soul." Further, he lays much stress upon the fact that the movement is not only a capitalist movement from above; it affects labour and the labouring classes as much as employers. "The idea of a super-personal economic leadership of the masses in work and in the sale and consumption of its products is prevalent and becomes a mere matter of course. In this the German working classes differ from all the Latin nations, for what in France and Italy is called socialism is indeed related in word and theory to the German workmen's unions, but has none of the sternness of inward determination which has been attained by our social democrats, or even by other unionist groups." He goes on to say that no class or section of the community escapes—"even artists," he says expressly. Finally, he sums up by saying that "the actual fact that we possess the most theoretical labour movement in the world is part of the picture of German economic life. This working class in combination with its educated employers, with our syndicate leaders, with our civil service and officers, does not offer the most charming and amusing society possible, but does constitute the *most practical, safe, and durable*[1] human machinery. This living national machine goes its way whether the individual lives or dies; it is impersonal or super-personal, has its frictions and interruptions, but is as a whole something that has never come to pass exactly in this way before; it is the historically developed German character" (p. 121).

Since Naumann wrote these words the world has had an opportunity of observing the effect of an organised attempt to introduce this "machinery" into a country where industry plays a relatively small part in the national life—for the leaders of the Bolsheviks have been profoundly influenced by German thought. The result, so far, has been to show that, even when it is introduced for the alleged benefit of "labour," it becomes at once an autocracy of the most virulent type. The people of Russia are not to be allowed to have the social conditions which they themselves want, which they as individuals and groups can evolve in accordance with their own conditions of life. They are to have a "theoretical" millennium imposed upon them from above, and to be shot down by machine-guns if they object.

Our naïve author goes on frankly to admit that the industrialised superstate is necessarily the state militant: "The war was really only a continuation of our previous life with other tools, but based on the same methods. . . . If our opponents like to label this intrinsic connection between the work of war and peace as 'German militarism,' we can only regard this as reasonable, for Prussian military discipline

[1] The italics are ours.

influences us all in actual fact, from the captain of industry (*Industrie-admiral*) to the maker of earthworks (*Erdarbeiter*)" (p. 122). He does not—it could not perhaps be expected that he would—allude to the fact, which has been noted by the thoughtful here, that when the military party insisted upon the clumsy weapons of guns and poison gas, as against the more dangerous means at the disposal of the industrialists, they were running great risks. Had the terrorists of Prussia not insisted upon open war, civilisation might have been choked before the world was fully aware of the stranglehold of the superstate.

We have emphasised Naumann's astonishing candour and simplicity. It can be readily understood that these qualities enable him to realise at once that the picture which he presents is not at first sight an alluring one to possible partners. To persuade the Austrians and Hungarians to permit themselves to be caught in the wheels of the great mechanism he relies chiefly upon two arguments.

The first is that the South German states, before 1870, showed the same reluctance to unite with Prussia, as he suspects to exist to-day across the German frontier when a larger union is in contemplation. He admits, by implication if not by direct statement, that those states had a life of their own, based upon local place relations, had ideals which were not Prussian ideals. Yet to-day, he says, their particularism has died away as a result of the experience of the material prosperity which union has brought. In his own phrase they have sold their soul to Prussia: but, as he proudly implies, in contradistinction to the action of the traditional dominant party to that form of transaction, Prussia has punctiliously paid up in gold—in current coin indeed, not the fairy gold of legend which turns to dust in its possessor's hand. As a consequence of this improvement on mediæval methods in South Germany to-day, "no one wants to put an end to the joint development, no one."

His second argument may be thought by some to show the cloven hoof. It is in brief that Austria-Hungary has no choice—a somewhat dangerous argument to use to a proud people! As he quite justly says the old pre-industrial condition, especially in the poorer regions, meant a very limited prosperity; limited in amount, and even more limited in distribution among the members of the community. We cannot go back, he says, and here there is no doubt that he is right. Ruskin and his followers were leading a forlorn hope. To abandon the new powers which man's ingenuity has won because they can be abused is rank folly. The question whether this is the only alternative to the German type of industrialism Naumann does not consider; that this represents the last word in social evolution must appear to him self-evident, for he does not even raise the question. "If you romanticists really wanted to preserve the good old time, with all its attendant features, thatched roofs, loss of time, and smells, then, though I should not join you, I should respect you as privileged and interesting eccentrics. But you don't want this at all! And, indeed, you could not! You could not because you yourselves would be much too poor for this new, pretentious present. Therein lies coercion for you

too, and the more so since after the war there will be much to pay. With rising prices it is impossible to be an economic romanticist without sinking in the social scale" (p. 140).

As a corollary to this argument he adds that not the whole soul will be required of the new partners. They may keep their music and their art, they may make it their mission to add to the "hard North German civilisation that touch of charm which will make it tolerable to the outside world" (p. 141). It is definitely implied, however, that this concession must be paid for, will be entered on the balance sheet as part of the purchase money.

Here we seem to come to the problem of Alsace-Lorraine.[1] Of the Reichsland, be it noted, there is little said in the book. There are certain oblique allusions both to it and to Poland, but Naumann carefully avoids mentioning the fact that if Bavaria and Wurtemberg have yielded, Alsace-Lorraine and Poland have not. Why? Why has the Alsatian, despite all that he has gained materially from the Treaty of Frankfurt, stood obstinately aloof? Why does he continue to present to the immigrant Prussian that spirit of mockery against which the latter's heaviest guns are of no avail? Clearly because he has behind him a tradition, based upon local place relations and upon the historical link with the France of the Revolution, which cannot be overthrown. The docile incomer, often an East Prussian, sure, not of himself, but of the superstate behind him, finds that he can neither impress nor convince the Alsatian. Nay more, he himself, if all tales be true, is puzzled and confused, shaken in his faith, by a resistance against which the weapons whose use he learnt in school and barrack, are helpless. Sent to convert, he is sometimes himself converted. To the Alsatian, more experienced in all the arts of life, he seems but a servile soul, constrained at his worst to cut open the heads of helpless cripples because it appears to him the only real way of showing that he is a man. The Reichslander feels that to those who through many generations have lacked sufficient bread, even of the coarsest kind, material prosperity may seem the greatest good. But to those who upon an old tradition of comfort have built an ordered, localised life, joy, satisfaction of the finer instincts, individualisation are necessary, and against this spirit the Prussian officer's sword is helpless.

The tradition of grinding poverty, as we have suggested, was once widely spread in parts of this country, still lingers in some places. But the material comfort brought by industrialisation has had already time to become a tradition; and upon it as a basis a new spiritual life is beginning to grow up. The Lancashire millowner is beginning to utilise his surplus wealth in the service of his city, if not of the state. The Northumberland pitman now earns in the pit not only his daily bread, for that he should ever come to lack that has not occurred to him, but leisure for self-development; and he is fumbling, if in an uncertain fashion, after means which will ensure this. The Provençal, even though his material prosperity has been badly shaken by the indirect effects of the industrial

[1] Cf. *S.G.M.*, xxxiv. pp. 81 and 121.

revolution elsewhere, still gets from his land, as he has always got, not only the essentials of material well-being, but, in the more delicate and intricate agricultural operations to which his soil lends itself, opportunities for tasting at least the joys of individual creative work.

Upon this world, with its admixture of old and new, with its variability, its individuality, produced and maintained by responses to particular environments, the Germans would impose their "new social-economic creed," with its deadening uniformity, its denial of personality, its attempt to replace the actual physical world, the world the geographer studies and the poets love, by a new machine-made construction. To the world-resistance they would oppose Prussian militarism. If immediate world domination prove impossible, then at least they must have security, forgetting that for living things in a changing world there is no security save in death, no chance of survival save in the variability which seems weakness to the short-sighted observer, but which all experience proves to be strength.

In an earlier period there lived in America the huge, heavily armoured Glyptodon, armed, like the Prussian state, against every foe, to all appearance irresistible. "Nature," says Professor Parker, "seems to have built him, as Rome was built, for eternity." But only his armour and his bones remain in a world which has moved past him. Has Prussia also forgotten that size and might are not all?

To sum up, to the geographer the inward side of the great war is that it is a deliberate attempt on the part of a group of men to emancipate themselves from the control of that changing, local environment which has produced all the life that we know. But in this Prussia has only carried to its utmost limit a line of argument common among those who have become intoxicated with the new powers of machinery, and have thought that with them the heavens could be stormed, the waters turned out of their courses. The bond which links almost all the civilised world against Prussia to-day is largely due to a deep instinct, whose formulation in words is difficult. That instinct may serve to overcome the immediate peril: but unless new ideals can be formulated in a regenerated and sobered world the danger may remain.

METEOROLOGY AND THE WAR.[1]

Weather variations and climatic conditions are obviously of enormous importance in warfare, and many examples could be cited by way of illustration in both ancient and modern history. On the great scale we have at sea the wreck of the Spanish Armada, and on land "the long-drawn agony of the retreat of the Grand Army from Russia in 1812," which has never been more vividly described than by Alison. Napoleon entered Moscow on 19th October in that year. An unusually

[1] Abstract of an afternoon lecture delivered to the Society in Edinburgh, on 14th March 1918, by Mr. Andrew Watt, M.A., F.R.S.E., Secretary to the Scottish Meteorological Society.

mild autumn had been regarded as a special sign of Divine favour to the invader and tempted him to linger too long in that historic city; and a fortnight later the Russian winter set in with more than ordinary severity.

During the present European war the luck in the matter of weather has been largely on the side of the Germans, though it will probably be found that they regret ever having commenced their gas attacks on the Western Front. In spring—and these attacks commenced in April 1915—easterly winds are frequent in northern France, but speaking broadly the prevailing winds in that area are from a south-westerly direction, and thus on the whole favourable to the Allies.

The suppression of the British weather forecasts very early in the war met with general approval, and the withdrawal from immediate publication of the *British Daily Weather Report* has certainly put the enemy at a disadvantage by restricting his area of outlook towards the Atlantic. A notable example of this was afforded by the loss of two Zeppelins over Jutland in a snowstorm on 17th February 1915, when the area of observation available to the Germans gave no indication of the approach of bad weather, whilst a rapid fall of the barometer in the West of Ireland, in point of fact, foretold very wild conditions over the North Sea. Regular pressure readings from such a place as the British outpost observatory at Valencia in the south-west of Ireland would be of great value to the Germans.

Since the outbreak of war the published administrative reports of the Meteorological Office have been of the briefest description, but a good deal can be gleaned from them. The operations of the office, so far as they relate to military matters, have been placed more particularly under the charge of Major (now Lieutenant-Colonel) H. G. Lyons, R.E., F.R.S., and it may be noted that, apart from great activity in the matter of forecasting, the demands of the Admiralty and the War Office for information of all sorts have been constant and urgent. It must be very gratifying to Sir Napier Shaw and his colleagues to be able to place on record, as has been done, that "the results of meteorological inquiries, initiated in what appeared to be the remote interest of the theory of the circulation of the atmosphere, have turned out to have important practical bearings, and collections of statistics, compiled in the ordinary course of meteorological duty, have now come in most usefully to meet urgent requirements."

Apparently it was not until after the first gas attacks by the Germans that there was a demand for the assistance of skilled meteorologists in the field, but shortly thereafter a meteorological section of the Royal Engineers was organised under Major Gold (now F.R.S.). That section has steadily increased in size, and the award of the D.S.O. to Major Gold, and numerous "mentions" of various members of his corps indicate that the work of the meteorologists on the Western Front has been of high value. In the Eastern Mediterranean, Captain E. M. Wedderburn, D.Sc., R.E.—the well-known limnologist—had been in charge. One can imagine that in the matter of general forecasting the work of a meteorological field force is of great service, but it is further possible

that scientific meteorology may be of much use in artillery work. Even in the case of small projectiles of low trajectory and comparatively short range, wind resistance is a vital factor, and a big shell with a range of several miles reaches great heights, and in its flight must pass through layers of the atmosphere of very varying wind-force, and with variations, and even complete reversals, of wind direction. By means of "pilot" balloons vertical soundings in the atmosphere can be made, which give a "resultant" wind up to any given height, that would be much more valuable to an artilleryman in determining the proper factor to be allowed for than observations of wind made merely at the earth's surface.

America has profited by British experience, and when the United States declared that a state of war existed with Germany an American meteorological field corps for work in France was at once organised under one of the chief forecasters of the Weather Bureau, and it is anticipated that the closest co-operation will exist with the French and British meteorological units. Moreover, our American Allies set aside a large sum for the establishment of special aerological stations for the investigation of atmospheric phenomena as affecting aeronautics.

The climatic conditions of the various theatres of the war are of much interest to the student of geography, particularly, perhaps, those of Syria where we can compare present-day conditions with those set forth in the Bible and in the writings of Josephus. All the indications are that the climate of Syria to-day is exactly the same as it was in ancient times. In this connection a twenty-years series of observations made at Hebron by Dr. Alexander Paterson, medical missionary, are of great importance, both from the point of view of historical comparison, and as affording recent and full information as to the day-to-day weather conditions to be looked for on the hill country of Syria.

The lecture was illustrated with lantern slides, amongst them some slides of cloud photographs taken from an aeroplane at a considerable height by Captain C. K. M. Douglas, R.F.C., whose recently published studies of cloud formation will compel attention when the classification of clouds at present generally accepted comes to be revised.

[*Note.*—Students should consult—*The Structure of the Atmosphere in Clear Weather*, by C. J. P. Cave, M.A. (Cambridge, 1912). Also, in the *Journal of the Scottish Meteorological Society*, "The Climate of Hebron (in Syria)," by A. Watt (vol. xii. pp. 133-52; "Hebron and its Climate," by Dr. A. Paterson vol. xiv. pp. 20-26); "Weather Observation from an Aeroplane" vol. xvii. pp. 65-73), and "The Lapse-Line and its Relation to Cloud Formation" (with thirteen Photographs of Clouds) (vol. xvii. pp. 133-47), by C. K. M. Douglas, R.F.C. A bibliography of "Recent Publications Relating to Military Meteorology" will be found in the U.S.A. *Monthly Weather Review* for January 1918.]

OBITUARY.

Professor Paul Vidal de la Blache.[1]

In the January number of this *Magazine* we published a review of the last work of this distinguished French geographer, *La France de l'Est*. We regret to have to announce that he died suddenly from heart disease on the 5th of April at the age of seventy-three, in the full vigour of his intellectual faculties, and with great projects for geographical work left uncompleted. To the last his life was one of constant industry, and it is astonishing how much he managed to accomplish in it. After a brilliant career at the *École normale supérieure* at Paris, and some years of study and travel in the Levant, as a member of the French School at Athens, for which he obtained a nomination in January 1867, he was, from 1871 to near the close of his life, engaged in the higher branches of teaching successively at Angers, Nancy, and Paris. At Angers he remained only one session, but he was five years at Nancy, first as *chargé de cours*, afterwards as Professor of History and Geography. In Paris he was at the head of the geographical department at the *École normale supérieure* from 1877 to 1898, when he was appointed to the Chair of Geography in the Faculty of Letters at the Sorbonne, where he was made Honorary Professor in 1914. He had indeed ceased to do active work there in November 1909, but before that he had been persuaded to lecture at the *École libre des sciences politiques*, and this work he continued in subsequent years.

But during all that time he had been busily engaged in preparing works for the press, in directing *Les Annales de Géographie*, the geographical periodical so well known to many of our members, which he founded in 1891, and in extensive travels in France, America, and elsewhere, for the sake of geographical observation. To the *Annales* he contributed copiously, and the titles of some of his principal articles are enough to show his leanings in geography: "Le principe de la Géographie générale" (1896); "La géographie politique à propos des écrits de M. Friedrich Ratzel" (1898); "Les civilisations africaines d'après Frobenius" (1899); "Les conditions géographiques des faits sociaux" (1902); "Les genres de vie dans la géographie humaine" (1911); "Des caractères distinctifs de la géographie" (1913); "La répartition des hommes sur le globe (1917); "Les grandes agglomerations humaines" (1917, 1918). From any one of these articles one might get a clear idea of the author's conception of the function of geography, for his exposition is always characterised by all a Frenchman's lucidity, which is such a blessing to the student as well as to the general reader. One may take, for example, the following from the conclusion of his article on the distinctive characters of geography: "That which geography can contribute to the common treasure in exchange for the

[1] The facts of the career of Prof. Vidal de la Blache are taken from the article on him by Prof. L. Gallois, written for the *Annales de Géographie* (No. 147), the editors of which were good enough to send an advance copy of the article to the writer of this notice.

aid which it receives from the other sciences, is the aptitude not to break in pieces that of which nature has made one whole, to understand the correspondence and correlations of facts, whether in the terrestrial environment which embraces all, or in the regional environments in which they are localised."[1] Or this from his inaugural lecture at the Sorbonne: "Without doubt the study of the earth, considered as a whole, answers to its definition; it seeks to arrive at the knowledge of general laws, but it makes it its business to study them in their application to various environments. It asks of them the means of explaining the differences of physiognomy which different regions present. . . . That which strikes us as soon as we are able to compare on a large scale the phenomena of the terrestrial surface is the marvellous variety of combinations which they present. Everywhere they are seen to be governed by the same general laws, but everywhere at the same time modified by the local conditions of soil, relief, climate, by the interaction of all the causes which concur to determine the distinguishing aspect of different regions."[2] It was in the spirit here indicated that he prepared his most important work, the *Tableau de la Géographie de la France*, which was published in 1903 as the first part of the first volume of the *Histoire de France*, by Ernest Lavisse, and which may be taken as a model of geographical description, in which a great variety of facts, obtained from a comprehensive study of science, combined with observation of the ground, acquired by walks spread over several years, are made to converge on the one aim of revealing the true geographical value of France as a whole and of its different parts. G. G. C.

GEOGRAPHICAL NOTES.

Europe.

Utilisation of Water-power in Italy.—M. G. Anfossi contributes to the issue of the *Annales de Géographie* for May 15 an article on the extent to which the water-power of North Italy is utilised at the present moment, which is to be followed by another dealing with Central and South Italy. Attention may be drawn specially to the article, not only because official publications on the subject are not in this case available as they are with regard to the water-power of the Swiss and French Alps, but because it raises some important geographical problems. Owing to limitations of space, we shall confine ourselves in this summary chiefly to general questions, referring to the paper itself for the details of the existing hydro-electric power stations and their distribution in the various valleys of the Alps and Apennines. We may add that the paper is illustrated by a very useful map, which shows the existing installations classified according to the power available, distinguishes between those in which the force is used locally and those in which it is

[1] *Annales de Géographie*, vol. xxii. p. 299. [2] *Ibid.*, vol. viii. p. 107.

conveyed to a distance, and shows also the railway lines at present electrified in North Italy. In addition there are a number of diagrammatic sketch-maps in the text, illustrating the conditions which prevail in particular valleys.

The author includes under the heading of North Italy not only Piedmont, Lombardy, Venetia, Liguria, and Emilia, but also Tuscany, usually included in Central Italy. The reason is interesting. As he points out, in considering the water-power of the Northern Apennines, it is necessary to include the two slopes; in one case, to the north of Genoa, water rising on the north slope of the Apennines is used, by means of a tunnel, to supply the installations placed on the south side of the chain. Bearing in mind the stress which is laid by military geographers on mountains as natural barriers between peoples, and thus as forming good boundaries, this abandonment of mountain chains as natural dividing lines seems highly significant. It is very probable that the water-power of the mountains of Europe is destined to be utilised with increasing rapidity in the immediate future, and while state boundaries there are temporarily in a state of flux, it seems very desirable to emphasise the fact that mountain chains are tending to lose their old significance as barriers. That significance was due, not only to the fact that they are difficult to cross in time of war, but because in times of peace they are, as a rule, of little economic value, and their slopes are sparsely peopled. Where their water-power is converted into electrical energy, however, their streams acquire new importance, and their valleys a new power of attracting population.

Further, it is usually implied, in discussions of mountain frontiers, that so long as fighting is confined to them and to the immediately adjacent regions, the economic life of neither combatant is greatly affected. But Signor Anfossi lays considerable stress upon the fact that while, up to the present, especially in Piedmont and Lombardy, it has been the textile industries which have depended upon electrically transmitted water-power, the tendency is now, to an increasing extent, to use the energy in metallurgical and electro-chemical industries. It is thus obvious that there is nothing impossible in the suggestion that an enemy force, without leaving the mountain zone, might, in some future war, paralyse the munition works of the plains by destroying the electrical installations. Since, further, there is an increasing tendency for the energy to be utilised as power on the railways, another danger also presents itself. The electric energy generated by water-power can be, of course—and often is—transmitted to a considerable distance from its place of origin.

Among other points of purely geographical importance raised in the paper, mention may be made of the differences in the ease with which the water-power of the mountains can be utilised, these depending in their turn upon topographical features. Thus it is pointed out that the absence of a prealpine zone in the Piedmontese Alps has acted as a check there. It means that the valleys are difficult of access, owing to the way in which the lofty mountains rise abruptly from the plain, while for the same reason railways, and even roads, are few, making the

establishment of factories difficult. The two valleys in which so far installations are numerous are those of the Maira and the Dora Riparia, the presence of the great railway trunk in the latter valley being an important factor. The Dora Baltea, with its great circle of snow-clad peaks, has enormous stores of water-power, but the difficulties of exploitation are great. The installations here are very recent, and the war demand for metals has been of great importance in promoting them. It will be remembered that around Cogne there are valuable deposits of iron ore, but that the difficulties of access are so great that, up till the time of the war, they were little utilised. This iron could be smelted on the spot by means of electrical energy, generated in the area. Meantime the most important use made of the power is in a large aluminium factory in the vicinity of Aosta.

The appearance of a prealpine zone in Lombardy makes the utilisation of water-power there much easier, this being assisted by the presence of the great lakes, which act as reservoirs. Here electric installations have been in operation for some time, chiefly in connection with textile industries, though metallurgical establishments are increasing. The fact that factories, and a relatively dense population, antedated the use of hydro-electric power is important.

Venetia is more unfavourably situated, the streams being torrential, great lakes absent, and glaciers few. Further, the valleys are inaccessible, railways are not numerous, and there are no great industrial establishments in operation at present which would serve as an outlet for the energy, as there are in Lombardy and Piedmont. But though the installations are few, those which exist are powerful. The energy generated is not used on the spot but distributed to a distance, especially to Venice.

The conditions in the Apennines are even more unfavourable. Here the climate becomes more Mediterranean in type ; there is less snow and evaporation is more rapid ; glaciers and great lakes are absent ; the slopes are steep in the mountains and gentle in the plains, and the abundance of clays, which are constantly slipping, is a great drawback. Here, as contrasted with the Alps, the construction of artificial lakes is necessary. Though this, on the one hand, makes the installations more costly, on the other, it brings the advantage of regulating the flood water, which is often so destructive in the valleys of the Apennines.

Further, a point of some interest, while the Alpine streams show a summer maximum with the melting of the snows, and a winter minimum, the Apennines show an autumn and winter maximum owing to the rains of the later months of the year. It is suggested, therefore, that if the energy derived from the northern slope of the Apennines could be co-ordinated with that derived from the southern slopes of the Alps, it might be possible to regulate the power supplied throughout the year. This suggestion is but a part of a future large scheme of co-ordinating the electric force of the mountain areas throughout the whole peninsula of Italy.

Two other points, only indirectly connected with the question of water power, may be mentioned. One is the generation of electric

power in the vicinity of Arezzo from the waste lignite produced from the mines there. Part of the product will not pay the cost of transport, and was accumulating round the mines in a disquieting fashion. Recently it has been burnt on the spot to produce electrical force. The second point deals with another method of utilising what was previously a waste product to generate electricity. At Larderello, near Volterra, there occur discharges of superheated vapour—"soffioni"—from which boric acid is obtained. Recently the vapour, before the extraction of its valuable contents, has been used to heat water, which, in its turn, is employed to drive turbines. Similar attempts are being made elsewhere to utilise the heat generated as a result of volcanic activity, Italy's great poverty in coal having led, during the war, to great efforts being made to utilise all possible sources of energy.

The Future of Esthonia and Livonia.—A short article in the *Bulletin Mensuel* of the *Société de Géographie Commerciale de Paris* (Jan.-Feb.-March 1918) brings out clearly the German object in endeavouring to establish a firm hold on the Russian Baltic provinces, especially Esthonia and Livonia with their important ports on the Baltic littoral. The essence of the problem lies in the fact that here, as in Courland and Lithuania, the economic life is based upon two main factors, the importance of the overseas traffic, and of agriculture. The lands are chiefly, though not exclusively, under the control of great feudal barons, of German origin and traditions, while similarly much of the maritime traffic is under the control of German colonists. In Esthonia the land is almost exclusively agricultural, forests covering only about 19 per cent. of the surface, as compared with about 40 per cent. in Livonia, which is less fertile. In Esthonia methods of cultivation are highly advanced, and this is true not only of the large estates, but also of the lands cultivated by the native Esthonians, who number some 366,000 as against some 16,000 Germans. The Esthonians, who are predominantly Lutheran in religion, show the same capacity for agricultural organisation, by co-operative associations and so forth, as is so well marked in Denmark and Sweden, and they are much more skilful cultivators than the ordinary Russian peasant. They were oppressed by the Russian autocracy in favour of the great barons, and since the Revolution their previous struggle against the domination of the great proprietors has been greatly intensified. The effect has been to incline these, who had previously supported the Russian autocracy, towards the German Empire. The rise of a native trading class in the towns has at the same time menaced the supremacy of the German colonists, in whose hands most of the shipping trade has been hitherto.

The exports of both regions are chiefly agricultural, especially hemp, butter, and eggs, with wood. The imports are chiefly raw or semi-manufactured material for the industries of North and Central Russia. From the German point of view the obtaining of a hold on the region means the possibility of obtaining a larger share than previously in Russian agricultural products, and also the power of hindering the import of industrial raw material into Russia proper, and thus of check-

ing Russian industry, and making that country more dependent upon German manufactured goods. Further, a hold on the Baltic ports would be of great value to the German shipping interests. Germany has thus every reason both to favour the German elements in Esthonia and Livonia, and to support the claim of these, despite their numerical inferiority, to represent the whole population of the area. Thus meantime the Revolution has only emancipated the native Esthonians and Livonians from the rule of the Russian autocracy in order to menace them with German rule.

A Great New Italian Atlas.—The Council of the "Touring Club Italiano" announces its intention of producing a *Grande Atlante Internazionale* which shall redeem Italy from the humiliation of being dependent on German atlases. In future Stieler, Andree, Debes, and even Baedeker are to be put on the "Black List," and Italy is to publish an Atlas which, by its excellence, completeness, and fulfilment of national requirements, will be superior to all foreign competitors. It is a most praiseworthy enterprise, and we cordially wish it all success.

In its general scope and conception the Atlas is to be essentially Italian, but it will also emphasise international features. Italy aims at the extension of her world commerce, and particular attention will be paid to showing the means of communication and transport in different countries. Whilst developing the best characteristics of the great atlases which it desires to emulate, it will also include various large-scale maps of the Italian colonies and those parts of Italy most frequented by tourists. The whole scheme is a considerable undertaking, but it appears to be well organised. The maps are to be issued to subscribers in sets, and each set will be complete in itself for one or more countries. It is expected that about sixteen maps will appear annually, and that it will take about eight or ten years to complete the whole work. This seems a long time, but it is hoped that progress will be expedited when the work is fairly under way. The scientific editor of the atlas is to be Professor Olinto Marinelli of Florence; the technical work of drawing and engraving will be under the supervision of Signor P. Corbellini; whilst the general direction will be controlled by Signor L. V. Bertarelli at the office of the club in Milan. The T. C. I. has done excellent work in the past, and its cartographic achievements in the department of touring maps and guidebooks are worthy of high praise. We have, therefore, every reason to believe that this new and ambitious venture will justify all expectations of success.

Polar.

Captain Roald Amundsen's Expedition.—Captain Amundsen started at the end of June on his deferred North Polar expedition. His vessel, the *Maud*, which is built on the lines of the *Fram*, and is fitted with a petrol motor, carries stores for five years. He proposes to follow the route of the *Fram* through the Barents and Kara Seas along the coast of Asia, and to enter the pack about 250 miles east of

the New Siberia islands, allowing his vessel there to be caught in the current which crosses the Arctic Ocean.

Return of Mr. Rasmussen.—The Danish Arctic explorer, Mr. Knud Rasmussen, returned to Copenhagen from Greenland in the month of May. During 1916 he explored the coasts of Melville Bay between Upernibik and Cape York, the ice having prevented him from reaching his station at Thule, in North Star Bay. In 1917 he explored the north-west coast of Greenland, reaching Sherard Osborne Fiord early in May 1917. The summer was spent in mapping the little-known fiords as far north as De Long Fiord. The absence of game greatly increased the difficulties of travelling. In the beginning of August the explorer started south and, with great difficulty, reached Cape Agassiz, and later Etah. Mr. Rasmussen left Greenland this spring, having found no trace of Eskimo migrations on the north-west coast; a search for such traces was one of the objects of his expedition.

Economic Geography.

Vegetable Oils from the Tropics.—The great rise in importance of the margarine industry, a rise which is practically certain to continue after the war, is leading to an increased cultivation of tropical oil-producing plants, especially the West African oil-palm and the coconut palm. The fact is of much general interest, for it means a shift of fat-production from the temperate zone to the tropical one. It is a familiar botanical fact that plants subjected to high temperatures tend to produce fats and oils rather than starch. Hitherto, the inhabitants of temperate zones have chiefly depended upon animals for the necessary fats of their diet, but the war has accentuated a tendency, which was already visible before its outbreak, to replace the costly animal fats by the cheaper kinds yielded by plants. This, in its turn, involves a fuller utilisation of tropical areas in the production of necessary foodstuffs, rather than of the luxuries which have hitherto been their chief yield. The ultimate effects may be very important. Meantime, we need only note that it is an obvious economy to grow the oil-palm in suitable areas in the tropics, rather than to produce maize in the Middle States of the U.S.A., and feed this maize to pigs to ensure the production of fat. The first method is direct, the second, and more costly, is indirect. A note in *West Africa* for March 23, gives some noteworthy details in regard to new plantations of the oil-palm in Java, Sumatra, the Malay Peninsula, and so forth. It is stated that already some 25,000 acres have been planted with the crop, the capital invested being £1,000,000. In West Africa, on the other hand, which has had till recently a virtual monopoly of palm oil and palm-kernel oil, cultivation is only carried on to a minor extent, the chief dependence being placed upon the collection of the wild product. The experience acquired in regard to crops like rubber, quinine, and so forth, leads one to believe that the yield of plantations carried on by scientific methods will be likely to oust the wild product, unless definite efforts are made in West Africa to replace

the present wasteful methods practised there. Another issue of the same journal points out that the attempts now being made, by means of duties, to favour the export of the West African product to British, rather than to continental ports, is the economic motive at the back of the establishment of the eastern oil-palm plantations.

A note in the *Times Trade Supplement* for March gives some further details in regard to the cultivation of the oil and coconut palms. The first tree has been already established on the north-east coast of Brazil, where it is grown in company with the coconut palm. The statement is made that throughout much of the tropics not only can the two trees be grown with much profit, but cattle and pig-rearing can be carried on at the same time. The coconut pulp, after extraction of the oil, can be used to feed the animals. A calculation is made that one acre of suitable tropical land would bear 50 coconut palms yielding 2000 lbs. of oil, 65 oil palms yielding 1750 lbs. of oil, and would support in addition two cows or five pigs. Further, accessory plants, such as pea-nuts, guava trees, pineapples, and so forth, could be grown in the plantations.

NEW BOOKS.

EUROPE.

The Question of Alsace-Lorraine. By Jules Duhem. Translated by Mrs. R. Stawell. London: Hodder and Stoughton, 1918. *Price* 2*s.* 6*d.*

The original French edition of M. Duhem's treatise on this important subject was reviewed at page 523 of this *Magazine* for 1917. In the present English edition a large addition to the original French work is given. M. Duhem points out "the mistake made by Bismarck, who was ill-informed in 1871 as to the value of the subsoil of Lorraine. He annexed the coalfields of the Sarre and the iron of Thionville, but neglected to exact a forfeit of whose worth he was ignorant, the iron in the basin of Briey." The last is now greedily desired by the "Pan-German League" and the "Independent Committee for promoting a German Peace."

The author refers to the past sufferings of the inhabitants of Alsace-Lorraine, and continues: "As is always the case with nations that have suffered deeply, they are remarkable for their attachment to their soil." We find this statement corroborated by Mr. Hugh Gibson, Secretary to the American Legation in Brussels, who tells us in his *Diplomatic Diary* how in August 1914 "the French got to Mulhouse and inflicted a decisive defeat upon the Germans According to reports, the Alsatians went mad when the French troops crossed the frontier for the first time in forty-four years. They tore up and burned the frontier posts, and generally gave way to transports of joy."

M. Duhem considers that Alsatians and Lorrainers "are both essentially French by race, by tradition, and by preference." He furnishes a key to the reason why the Germans invaded France through Belgium in 1914 by describing the strength of the fortifications France had built to defend her eastern frontier after Strasburg, Metz, and other strong places had been taken from her by Germany in 1870-71.

While the author insists upon the return to France of the German annexations of 1815 and 1871, he denies that France claims Trèves, Mayence, Cologne, Coblenz, and the entire left bank of the Rhine, for that "would be to overleap the bounds of justice."

With regard to the great and often complicated historical question, M. Duhem contradicts those German writers who declare that Germany has historical claims to the possession of Alsace-Lorraine. As a matter of fact, we have to consider the histories of Alsace and Lorraine separately from each other in order to arrive at the truth. Alsace was transferred by Austria to France by the treaty of Westphalia in 1648. Prussia was then not a kingdom, but a small province on the Baltic, and had no right whatever to Alsace. Lorraine was acquired by France by the treaty of Vienna in 1738, and Prussia had no right whatever to Lorraine. Consequently the claim of the present King of Prussia, now German Emperor (but by no means successor of the ancient Emperor of Germany) to either Alsace or Lorraine has no historical foundation whatever.

Germany, 1815-1890. By Sir Adolphus William Ward, F.B.A., Litt. D., Master of Peterhouse. Vol. ii.: 1852-1871. With Sections by Spenser Wilkinson, M.A., Chichele Professor of Military History, Oxford. Cambridge: at the University Press, 1917. *Price* 12*s. net.*

This is a book for the student, and we should imagine that it is absolutely indispensable for a correct knowledge of German aims and tendencies. A geographical journal is not the place to criticise it from the historical point of view, and indeed the names of the authors are ample guarantee of the soundness and authoritativeness of the work. As geographers we should like to have had a short *résumé* of the physical conditions which controlled the Austro-Prussian and the Franco-Prussian campaigns. The influence of the configuration of Denmark on the war of 1864 is well brought out (pp. 153-154), but this treatment is not maintained in the later narratives of 1866 and 1870. From a general point of view Bismarck emerges as the one great man of the time, the man who knew throughout what he was doing and why. It may be old-fashioned, but we confess to having a weakness for "character-drawing" in histories. In this book the reader has to dig out the characters of the actors for himself. A hint is given here, a touch there, but there is no formal estimate. Perhaps, however, this is reserved for the third and concluding volume of the series. Certainly, too, a fourth volume will be required, but the time is not yet.

The Story of the Salonica Army. By G. Ward Price. London: Hodder and Stoughton, 1918. *Price* 6*s. net.*

Any one who is desirous of knowing something of the work and the hard fighting done by our army in this comparatively little-known region of the stormy Balkans, and of the almost insurmountable difficulties which have confronted the allied Generals and the troops under their command, cannot do better than turn to this book in which Mr. Ward Price, who is described as the official correspondent with the allied forces, tells of the events of which he has been a witness up to the summer of 1917. It is a deeply interesting story which Mr. Price has to tell, and he tells it in simple yet vigorous language. As he says himself in his foreword, "it is a trying campaign that we are waging in Macedonia, a monotonous campaign, and one that by comparison with the Western front sometimes seems to the men out there like a backwater where they are half-forgotten by their friends at home.

But they keep their hearts high and their fighting spirit unabated." He might have told us more of the gallant way in which our army and those of our allies have been doing their duty ; but, in spite of his efforts to avoid indiscretion, the Censor has laid an obliterating hand on parts of his book.

Mr. Price is very outspoken in his criticisms of the mistake of the allies in general, and of our own mistakes in particular, from the very beginnings of the campaign, the main purpose of which was to bring aid to the sorely pressed army of the Serbs, which, as we all know, was being forced southwards and eastwards by the remorseless drive of the Germans and Austrians, aided by the army from Bulgaria acting on the Serbian flank. Here again the fateful words "too late" have to be pronounced, for, had it been possible to bring material aid from the allies one fortnight earlier than was the case, the position might have been saved, and the disastrous retreat of the Serbian army and the people across the snow-covered mountains into Albania might not have taken place. But Mr. Price freely admits that the position of the allies has been a most difficult one throughout—their armies made up of half a dozen different nationalities, operating in a barren, fever-stricken land in which transport was a constant problem, with an active, well-equipped enemy in front, and a very doubtful Greek army to be reckoned with in their rear. In relation to the attitude of the Greeks the author gives us an interesting study of the position of hostility towards the Entente assumed by King Constantine, and of the ties which bind him to Germany. The training of the King as a soldier in the German Guard had the result of "filling him with a profound admiration for the genius and infallibility of the German military machine," and he is quoted as having said to a friend of Mr. Price that "the Germans may not win, but they cannot be beaten in a hundred years." Allowance is also made for the influence and encouragement in this direction exerted by "that able and strong-minded lady, the Kaiser's sister, Queen Sophia."

The first stage of the allied campaign was in the winter of 1915, when the French attempted to join hands with the retreating Serbs in the valley of the Vardar, as far north as Krivolak and the slopes of Mount Archangel. In these operations they were aided by our Tenth Division (consisting chiefly of Irish regiments), which operated on the road from Lake Doiran to Dedeli and formed the right flank of the French force. There was much hard fighting in the midst of adverse conditions arising from snow and mud, and our men were exposed to the winter on the barren and inhospitable Dedeli ridge, where they were caught by that same blizzard which caused such terrible suffering to our army in Gallipoli. In this position they were attacked by the Bulgars in great force, and the Tenth Division participated in the French retreat from Serbia.

Considerations of space prevent us from following up the various stages of the campaign which culminated in the recapture of Monastir in November 1916, all of which are dealt with in Mr. Price's book. If the campaign has not justified in its results the expenditure of men and material, we have to remember the high hopes with which it was undertaken of combining with Russia and Rumania in defeating the German schemes of domination in Central Europe. Mr. Price comments on the failure of the allies to occupy the Rupel Pass, thus leaving the road down the Struma valley towards Demirhissar and Seres open to the enemy. But, as Mr. Price repeatedly emphasises, the conditions in Macedonia weigh more heavily upon us than upon the enemy—"both as regards transport and as regards fever the balance of advantage has always been with our opponents, thanks to the physical characteristics of the region in which we are fighting." He quotes a high authority as saying that "the force in the Balkans is peculiar in one great respect. It is expected to hold a front under modern conditions with communications which

would have been considered inadequate in the Napoleonic period," and there is no question that the geographic and climatic conditions have had an immense influence on the campaign. "Macedonia is to all intents and purposes a desert into which everything our armies require has to be imported." And, as if this were not enough, it is also "one of the most malarial places in the world." In a striking passage Mr. Price contrasts the situation of ourselves and the enemy as regards the transport of reinforcements and war material. In this the enemy possesses the enormous advantage of inner lines of communication. "The Germans load up a railway truck with shells in an Essen factory yard, and that truck travels in perfect security over the best railway system in Europe right up to the Bulgar railhead, not a dozen miles behind the front we are fighting them on." The same holds true as regards reinforcements, "which can be rushed out to the Balkan front from Germany in six days." It requires little imagination to picture the contrast of the allied position, with a long sea route of 3000 miles round by the Mediterranean which is exposed to submarine attack and requires about three weeks to traverse it.

Salonica again is, or chiefly was at the earlier stages of the campaign, a nest of spies, and has been notable for the exorbitant dealings in necessities and housing for the army of occupation. On this and other matters Mr. Ward Price has much to tell which is well worthy of attention, and he tells it in a fashion which holds the interest of the reader. The book is illustrated by a few photographs of no particular interest, and we could have done with larger and better maps as a help to following the course of the campaign.

A Frenchman's Walk through Ireland. Translated from the French by JOHN STEVENSON. Belfast: Macaw, Stevenson and Orr, Ltd. 1917.

Mr. Stevenson may be congratulated on having made a find. The book which he has translated into very readable English—occasionally, it may be, Scoto-Irish—contains the account of a walk through Ireland made as far back as 1796-7, an account for the most part bright and amusing, and in places not without instruction even for the present day. The author of the original, Mr. de Latocnaye (or when he wished to pass himself off as a Scotsman, Mr. Mactocnaye), was an *émigré* of vivacious, sanguine, amiable, and yet sturdy and independent temper—withal unmistakably French—who, tiring of the monotonous idleness which most of the *émigrés* consented to endure, occupied himself in travelling through the country which afforded him hospitality, and recording the results of his observations. Confident in his own powers of observation, he sets down his impressions fresh as they arise in his mind without being over-anxious about the need for consideration, which at least has the advantage of adding to the raciness of his narrative. The present volume, it should be stated, is not confined to Ireland. The idea of the tour came to him in London, so he could not but put on paper what struck him on his way to the sister island by Bath, "a city in which everybody runs so much after pleasure that pleasure seems to run from everybody," and Milford Haven, "an ugly hole"—very different accordingly from what it appeared to the present reviewer a hundred years later. A second visit to Scotland is intercalated in the Irish tour, an occasion for more notes—on the whole not unflattering. He is in truth rather too complimentary to Scotland, for he tells us that "the greater number of famous authors who have appeared in Great Britain during the last century were Scotch. It suffices to mention Hume, Robertson, *Fielding* (italics, ours), and Smollett." He adds, "I have often thought that the most generally well-informed and at the same time most sociable class is that of the lawyers of

Edinburgh. A stranger who would desire to know the best of the inhabitants of the three kingdoms should try to become acquainted with the rich merchants of London, the lawyers of Edinburgh, and, in their country houses, the landlords of Ireland" (pp. 238-9).

Though Mr. de Latocnaye landed from Milford Haven at Waterford, the walk began at Dublin. It may be said to have been made without impedimenta. "My whole baggage," he tells us, "slung on my shoulder or in my pocket, I walked, I ran, I searched"; yet, in spite of this light equipment, although he was wet to the skin nearly every day (this is a note belonging to the early part of his walk), and often much fatigued, he grew "visibly fairer and fatter." Moreover, he was able to appear on proper occasions in correct evening dress with pumps and silk stockings. For Mr. de Latocnaye was well provided with letters of introduction, through which he was nearly always certain to find good quarters in the evening, and frequently a cordial reception by an interesting host for longer periods. But when these failed him he was able to take his privations in the spirit of "a citizen of the universe," as, he says, emigration had made him. The very first night of his walk he found himself compelled to pass the night on a three-legged stool, his back leaning against the wall, and on more than one occasion he had an even more trying experience. Yet his reflection after the first night is:—"How profitable this night would have been to me had I been always the favoured child of fortune! I would advise parents to force their children thus to pass several nights in their youth; it would be more advantageous to them than years at school. Really to have compassion on the poor and to have a real desire to help them requires that they should be approached." He says much that throws light on the condition of Ireland even now. One thing that has in the meantime been changed not unnaturally excites his astonishment, the wealth of the Anglican clergy, as compared with the scantiness of their flocks. "Oh, what a lovely thing it is to be an Anglican bishop or minister. These are the spoiled children of fortune, rich as bankers, enjoying good wine, good cheer, and pretty women, and all that for their benediction," he exclaims in speaking of the rich bishopric of Derry, at that time held by the same Lord Bristol who called up similar thoughts in Goethe's mind when he visited him at Weimar. But in spite of all that he saw, in spite of the fact that during his walk took place Hoche's attempted invasion of Ireland, and that his walk was completed just about a year before the rebellion of the United Irishmen, the author's sanguine happy temperament is shown in the favourable prognostications he repeatedly makes as to the approaching disappearance of animosities in Ireland and the coming peace and prosperity (see pp. 31, 82, 122, 226, and the concluding paragraph of the book), though it is true he records (p. 185) an incident which causes him to remark that it is very strange that, so many centuries after the conquest of Ireland, the two peoples should not be united, and to add "probably they never will be." It is very unfortunate that we still have the same hopes, the same doubts.

AUSTRALASIA.

Round about the Torres Straits: A Record of Australian Church Missions. By the Right Rev. Gilbert White, M.A., D.D., Bishop of Willochra. London: Society for Promoting Christian Knowledge. *Price* 2*s.*

The region of the Torres Straits is not one of the most attractive parts of the earth, and the inhabitants are not the most winsome. Trade and commerce have not found the region particularly profitable, and have left it practically alone. But the missioner beheld that there were people there, and the Church answered

his call. Thanks to the labours of these undaunted pioneers and empire-builders, the whole inhospitable region is becoming pretty well known. Bishop White gives an interesting account of what his Church has done in elevating the natives on both sides of the Straits, in the north of Australia, and in New Guinea. The incidents and experiences recorded show the inside of the Papuan mind and the lands around where storms can rage and mosquitoes can bite. He writes with a fluent pen, and tells his story well, and, though brief, it is well worth telling. His book is enhanced by a good map of the region, and a number of illustrations.

GENERAL.

My Round of the War. By Basil Clarke. London : William Heinemann, 1917. *Price* 6*s. net.*

This is an unpretentious and most readable book. The author was sent to the Continent as a war correspondent, and in two and a half years he visited Flanders, Greece, Rumania, Russia, France, finishing with a journey from the front-line trenches to England with a wounded soldier. It is a personal narrative, disregarding high strategy and politics, and yet in a series of snap-shots, as it were, we hear how the monitors stopped the rush on Calais by the coast-road, what was the state of feeling in Rumania and Bulgaria before their respective entries into the war, of "that amazingly fine creature the Russian soldier," of the difference between the early days when the war correspondent had to work as a species of outlaw, and the later days when his work was forwarded by the special attentions of Headquarters, of the craving of the wounded for tea, of the splendid behaviour of nurses in moments of danger, and of many other matters of interest. It is all told pleasantly, with equanimity and an observant eye, and any one who begins the book will wish to read every page.

The War and the Future. By the Right Hon. Sir Robert Borden, G.C.M.G., Prime Minister of the Dominion of Canada. Edited by Percy Hurd. London : Hodder and Stoughton, 1917. *Price* 2*s. net.*

This is a narrative of Canada's part in the war, compiled from speeches by Canada's Prime Minister. The first speech was made in the Canadian House of Commons on the 18th of August 1914, and the last at Edinburgh on the 11th of April 1917. "How England strove for Peace," "The Kingdom of the Air," "British Ideals," and "Hopes for the Future," which are the titles of some of the chapters, sufficiently indicate the nature of the volume. It is skilfully put together, and is an invaluable record of a part of the story of the war.

EDUCATIONAL.

The World we Live in. Edited by Graeme Williams, F.R.G.S., F.G.S., F.Z.S. Vol. iv. London : The Waverley Book Company, Ltd., 1918.

Vols. i., ii., iii. of this publication have already been reviewed in the *Magazine.* The publishers state that this, the concluding volume, has only been produced after innumerable difficulties, but there is no evidence of this within the volume itself, which fully maintains the high standard set in the previous volumes. It deals with South America, Europe and Asia, the treatment of each country having been entrusted to specialists qualified to deal with their subject. With the exception of one chapter, the section on South America has been done by W. H. Koebel, F.R.G.S., who is already well known by his writing on South American countries. The general treatment is on a regional basis, the information being adequate and up

to date, and special attention being paid to the prospects of future development. The section on Europe is the work of Professor Grenville Cole, and is one of the best sections of the whole work. As might be expected from Professor Cole's eminence as a geologist, the treatment is specially strong from the point of view of structure which forms the basis for a full and clear description of the natural units of Europe. Much of the descriptive work seems to indicate personal acquaintance with the regions. The section on Asia is the work of Mr. R. J. Finch, F.R.G.S., with the exception of the chapters on Turkey in Asia, Iran, India and Indo-China, which have been done by Professor Arthur Holmes, of the Imperial College of Science. The treatment is on the same lines as the other sections, and is sufficiently thorough and up to the standard of the rest of the work. Numerous illustrations and sketch-maps add to the value of a work which appeals more to the geographical student than to the general reader. All interested in geographical studies will find it a valuable acquisition for their bookshelves, and it should be added to every good school library.

Visual Geography. By AGNES NIGHTINGALE. Book III. Many Lands. London: A. and C. Black, 1918. *Price* 10*d.*

Book III. continues the features of this series. It deals with typical lands throughout the world, and a simple description of the outstanding characteristics of each land and its people is accompanied by pictures which are meant to be coloured by the pupils, the aim being to give the pupils a mental picture of the subject and to cultivate the power of visualisation and develop the geographical imagination. This giving "something to do" as well as to see and read about is just what is wanted in the kindergarten and infant school, and will also serve well for home use.

BOOKS RECEIVED.

My Life as a Naturalist. By W. PERCIVAL WESTELL, F.L.S. With an Introduction by the EARL OF LYTTON. Frontispiece, and 100 Illustrations from Drawings by NED BRYANT. Small royal 8vo. Pp. xxiii + 268. London: Cecil Palmer and Hayward, 1918. *Price* 7*s.* 6*d. net.*

The Story of the Paris Churches. By JETTA S. WOLFF. With Illustrations. Small royal 8vo. Pp. 285. London: Cecil Palmer and Hayward, 1918. *Price* 7*s.* 6*d. net.*

On the Fringe of the Great Fight. By Colonel GEORGE G. NASMITH, C.M.G. With Illustrations. Demy 8vo. Pp. xiii + 263. Toronto: McClelland, Goodchild and Stewart, Ltd., 1917. *Price* $1.50.

In the Alaskan Wilderness. By GEORGE BYRON GORDON, Sc.D., F.R.G.S. With Illustrations and Maps. Medium 8vo. Pp. 247. Philadelphia: The John C. Winston Co., 1917. *Price* $3.50 *net.*

The Development of the British West Indies, 1700-1763. By FRANK WESLEY PITMAN, Ph.D. Yale Historical Publications: *Studies*, vol. IV. Demy 8vo. Pp. xiv + 495. New Haven: Yale University Press. London: Humphrey Milford, 1917. *Price* $2.50 *net.*

Homesteading: Two Prairie Seasons. By EDWARD WEST. With 32 Illustrations. Crown 8vo. Pp. 302. London: T. Fisher Unwin, Ltd., 1918. *Price* 10*s.* 6*d. net.*

Essentials of Practical Geography. By B. C. Wallis, B.Sc.(Lond.), F.R.G.S. Crown 8vo. Pp. xv + 213. London: Macmillan and Co., Ltd., 1918. *Price* 4*s.* 6*d. net.*

Cyprus under British Rule. By Captain C. W. J. Orr. With Map. Demy 8vo. Pp. 192. London: Robert Scott, 1918. *Price* 6*s. net.*

Note on the Routes from the Panjab to Turkestan and China. Recorded by William Finch (1611). By Sir Aurel Stein, K.C.I.E. Lahore, 1917. Reprinted from the *Journal of the Panjab Historical Society*, vol. vi.

Presented by the Author.

Reasons for Giving Geography a Greater Place in the High Schools. By George D. Hubbard, Oberlin College, Ohio. Reprinted from *School Science and Mathematics* for April 1918.

Geography in the Columbus, Ohio, Quadrangle. By George D. Hubbard. Reprinted from the *Ohio Journal of Science*, vol. xvii. No. 5.

The Official Year-Book of New South Wales, 1916. Edited by John Trivett, F.R.A.S., F.S.S., Sydney, 1917. *Price* 2*s.* 6*d. net.*

Railways in India: Administrative Report for the Year 1916-17. Vol. i. *Report.* Vol. ii. *Appendices.* Simla: Government Central Press, 1917. *Price* 2*s.* 3*d. each.*

Report on the Administration of Coorg for 1916-17. Mercara, 1917. *Price* 1*s.* 10*d.*

Meteorology in Mysore for 1916. Twenty-fourth Annual Report. By N. Venkatesa Iyengar, B.A. Bangalore, 1917.

Punjab District Gazetteers. Vol. xiv. b. *Jullundur.* Vol. xxx. a. *Shahpur.* Vol. xxx. b. *Lahore, Statistical Tables*, 1916. Lahore, 1917. *Prices* 2*s.* 3*d.*, 6*s.* 6*d.*, *and* 3*s.*

Punjab States Gazetteers. Vol. xiv. b. *Kapurthala, Statistical Tables*, 1916. Lahore, 1917. *Price* 1*s.* 6*d.*

Bengal District Gazetteers. Mymensingh. By F. A. Sachse. Calcutta, 1917. *Price* 4*s.* 6*d.*

District Gazetteers of the United Provinces of Agra and Oudh. Vol. xi. *Etawah.* Vol. xx. *Fatehpur.* Vol. xlvi. *Sultanpur.* Vol. xxxiv. *Naini Tal.* Allahabad, 1917. *Prices* 10*d.*, 1*s.* 3*d.*, *and* 1*s.* 6*d.*

Report on the Administration of Assam for 1916-17. Shillong, 1918. *Price* 4*s.* 6*d.*

Report on the Administration of the Punjab and its Dependencies for 1916-17. Lahore, 1918. *Price* 2*s.*

Annual Report on Papua for the Year 1916-17. Melbourne, 1918. *Price* 1*s.* 9*d.*

The Canada Year-Book, 1916-17. Ottawa, 1917. *Price* $1.

Statistical Abstract for the Several British Self-Governing Dominions, Colonies, Possessions, and Protectorates in each Year from 1901-1915. Fifty-third Number. London, 1918. *Price* 2*s. net.*

Colonial Reports (Annual).—Barbados (951); Leeward Islands (952); St. Vincent (953); Uganda (954): Nyasaland (955); British Honduras (957).

Report on the Administration of the United Provinces of Agra and Oudh, 1916-17. Allahabad, 1918. *Price* 1*s.* 6*d.*

Burma Gazetteer, Akyab District. Vol. a. Rangoon, 1917. *Price* 3*s.* 5*d.*

Madras District Gazetteers. Tinnevelly. Vol. i. Madras, 1917.

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

CHINA'S GEOGRAPHY: HISTORICAL AND SOCIAL.[1]

By Sih-Gung Cheng.

(With Sketch-Map and Illustrations.)

In the lecture which I have the honour to deliver to you to-night, I propose to deal with three different topics. First, I shall deal with the question as to the way in which the science of Geography has been studied by the Chinese. Second, I shall describe to you some important aspects of the historical geography of the Chinese Empire. And, thirdly, I shall say something of the social, industrial, and political progress that has taken place in my own country in recent years. You will see that the ground I endeavour to cover is very vast: and, indeed, it is so vast, that I fear I may have to transgress your time limit, or that I may fail to convey my points to you with explicitness and clearness. But I hope that a man from China, who has no difficulty with his own language, may have greater facility in getting access to Chinese sources of information, and that thus he may be in a more advantageous position than an Englishman or a Scotsman in dealing with the subject on which I am lecturing to-night.

Geographical Science in China.—In regard to the first topic, namely, how the science of Geography has been studied by the Chinese, we may note that, like many other Chinese phenomena, the study of geography dates back to two thousand years before the Christian era. In *The Canon of History*, a record of events which happened between 2500 and 1000 B.C., a long chapter under the title "Yü Kong" is devoted to the geography of the Empire. In it political divisions are set out, provincial boundaries sketched, mountains and rivers located, the nature of the soil in each province described, and its products

[1] A lecture delivered before the Society in Edinburgh on February 28, 1918.

enumerated. Through the eyes of a modern scientist, the geography studied in this chapter is perhaps not comprehensive nor sufficiently detailed, but considering the time and the circumstances under which it was written, I agree with many distinguished scholars, both European and Chinese, in saying that it is a masterly piece of work. A quotation from the chapter will, perhaps, substantiate my argument:—

"The Sea and the Mountain were the boundaries of the Province Tsing Chow. The territory of Yu-e was defined; and the Wei and the Tsze were conducted by their proper channels.

"The soil of this province was whitish and rich; near the sea were wide tracts of salt land. Its fields were the lowest of the first class, and its contribution of revenue the highest of the second.

"Its articles of tribute were salt, fine grass-cloth, and the productions of the sea of various kinds; with silk, hemp, lead, pine trees, and strange stones, from the valleys of the Tae. The wild were taught tillage and pasturage, and brought in their baskets the silk from the mountain mulberry.

"They floated along the Wan, and reached the Tse."

At about the same time as this *Canon* another book on geography was written under the title *Canon of Mountains and Seas*. The author of this book is said to be unknown, but both the *Catalogue* of our Imperial Library in Peking and the *Imperial Encyclopedia* attribute it to the Emperor Yü (2200 B.C.). A quotation from this book will reveal to you some of the strange and sensational things recorded there.

"The top of the southern Mountain is called 'Bird's Mountain,' and faces the Western Sea. The Cassia or Cinnamon tree is grown there, and gold and jade are plentiful. A sort of grass Scallion with green blossoms can satisfy hunger. A sort of animal with white ears looks like a monkey and walks like a man, and those who eat its flesh can walk rapidly.

"Three hundred miles east of this mountain is Mountain Ti. Water is plentiful there, but there is no grass. A kind of fish, with shape and voice like a cow, and a tail like a snake, lives there in summer and dies in winter. A sort of animal looking like a fox with beards is self-impregnating. Those who eat its flesh will never be jealous. Another sort of animal looks like a sheep with nine tails and four ears and with its eyes on its back, and those who wear its skin have courage."

The quotation is taken with a view to showing the strange character of some parts of the book, and modern critics discredit it for the uncommon and strange birds and animals it records. But most of the mountains and rivers mentioned in it are still traceable at the present day.

In the Book of Ritual of the Chow dynasty, which ruled China from 1150 to 550 B.C., one finds that a special government department was then in existence, the function of which was to make and keep maps. That the importance of maps has been appreciated by the Chinese since very ancient times may be proved by the fact that in the year 206 B.C., when the founder of the Han dynasty entered Siganfu with his army, the first thing his chief minister did was to capture the maps from

the Treasury of the falling house of Tsin, and thereby he became acquainted with the strategical points, fortifications, and the wants of the civil population.

In the first century B.C., the first of the twenty-four dynastic Histories was written by the grand historian, Sze Ma Chien. In it, a book was devoted exclusively to the rivers and streams of the Empire. Rivers, canals, swamps, tides, and floods were minutely recorded, and particular attention was paid to notable events, such as fighting and feasting, that took place on the rivers. I may mention in passing that a French translation of this first dynastic history is now available, thanks to the exertions of my learned friend Professor Ed. Chavanne.

The example set by this first dynastic history was followed and amplified by the subsequent twenty-three dynastic histories. In each of them there is a book dealing with the political geography of the Empire. Any change in political divisions caused by a change of dynasty is recorded, and the relation of geography to the distribution of governorships or vice-royalties is specially emphasised. Routes, strategical points, mountain passes, postal routes, transport canals, river basins, the number of households in each district—all these are stated and tabulated according to the best obtainable information.

I might say that although political geography has been elaborately dealt with in these dynastic histories, economic geography should have claimed more attention than it did. But the deficiency is made good by the fact that, in every one of these dynastic histories, there is a chapter under the title "Foods and Commodities," giving information on the production of minerals, metals, salt, cereals, and the like, in different parts of the Empire.

In addition to our dynastic histories, Chinese Encyclopedias also deal with geography on a large scale. There are several Encyclopedias, but I shall take as an illustration the latest and the most accessible one, a copy of which is available in the British Museum and the School of Oriental Studies, London.

Geography is studied there under four heads: (*a*) Physical Geography; (*b*) Political Divisions; (*c*) Rivers and Mountains; (*d*) Foreign countries. Each head is subdivided into many sections. For instance, under Physical Geography, one finds separate and lengthy sections on: (1) Theory of the Globe; (2) Longitude and Latitude; (3) Geographical Relation of China to the Rest of the World; (4) Soil and Clay; (5) Minerals; (6) Springs; (7) Hot Springs; (8) Wells; (9) Salt Wells; (10) Capitals of the Empire; (11) Customs and Frontiers; (12) Markets; (13) Imperial Mausoleums; and (14) Cemeteries.

Under political divisions, the geography of the different provinces, prefectures, and districts is studied in its physical, economic, and human aspects. The other two headings, "Mountains and Rivers" and "Foreign Countries" are self-explanatory, and their subdivisions are arranged in a more or less arbitrary order. Under foreign countries, much is said of Korea, Japan, the Philippine Islands, Arabia, Syria, India, Turkey, and many Central Asian tribes, but little of Europe.

Apart from the books which deal with the geography of the Empire

as a whole, there is in China, in every province, prefecture, and district, a series of books on local geography, compiled under official supervision, and revised every ten years. The scope and the contents of these three kinds of local geographies are about the same, though, of course, they touch on areas of different size. In any one of the three, as a rule, one finds that the subjects are treated under the following headings:—

(*a*) Historical changes in the extent of the area treated.
(*b*) Frontiers.
(*c*) Longitude and latitude.
(*d*) Walls and towers.
(*e*) Temples.
(*f*) Mountains and hills
(*g*) Palaces.
(*h*) Public gardens.
(*i*) Official buildings.
(*j*) Public schools.
(*k*) Population.
(*l*) Land tax.
(*m*) Local militia.
(*n*) Produce.
(*o*) Ruins.
(*p*) Literati and men of eminence of the locality.

So far I have dealt with comprehensive books on geography. But, like every other civilised country, China has produced many geographers who have written on some particular aspects of geography or on some particular locality. Thus in looking through the *Catalogue* of our Imperial Library, I find books of great importance like:

(*a*) Travels in the Buddhistic Countries, by a Monk.
(*b*) Historical Geography of Chengtu, by Chan Pian (1200 A.D.).
(*c*) Military Expedition to Western Countries, by General Chang Kien.
(*d*) Life in a Northern Desert.
(*e*) Peoples of Turkey.
(*f*) Routes in Western Asia.
(*g*) Korean Customs.
(*h*) Yellow River in Tibet.
(*i*) On Southern Barbarians.
(*j*) Geography of Kitans, Manchuria.
(*k*) Unity of the Empire (1200 A.D.).
(*l*) Customs and Produce in different Provinces during the Sui dynasty.
(*m*) Maps of Five Sacred Mountains.
(*n*) Travels in Middle India (1200).
(*o*) Historical Geography of the Empire (1810).
(*p*) Notes on Geography.
(*q*) A Conspectus of the Historical Geography of the Empire (1858), by Koo Tsoo Yu.
(*r*) Maps 1864, 1879, Maps of every Province, 1826.

The books I enumerate here do not represent more than one-thousandth part of the total number of volumes that have been published. Many of the old books have been destroyed and editions are no longer obtainable: but others are still kept intact in the Imperial Library, and new editions have been brought out from time to time to meet public demand.

With due regard to what Herbert Spencer calls patriotic bias, I feel that I must say that China's geographical learning has been adequate to and worthy of her high standard of civilisation, and has justified her in her acknowledged position as the oldest surviving country that has contributed much to the stock of human culture and art. But one defect I must acknowledge, and that is that the Chinese are not good map-makers. From very ancient times we have understood the use of the scale and compass, but we have invented nothing like hachures or the contour system to show relief. Up to the time of our contact with modern Europe, we had to content ourselves with very unintelligible marks or clumsy figures to show heights. There were no means of comparing different heights at different places. Even the colouring of maps was not much used.

The Chinese have, of course, much to learn from the West in the art of map-making, but I am glad to say that the teaching of geography in Chinese schools, and the map-making of Chinese printing firms have already been much influenced by Western methods, and I hope that the scientific and academic co-operation between China and the West will bring forth a substantial contribution to human civilisation.

Historical Geography of China.—Like all other States, China has changed the size of her territory throughout her history. The historical records which the Chinese possess go back to 2500 B.C. Ethnologists differ in their opinions as to the origin of our race, but it is certain that the Chinese in ancient times inhabited the north-western corner of the Empire—now the provinces of Shensi and Shansi.

The *Canon of History*, which I have already referred to, tells us that the Emperor Yü (B.C. 2205-2196), after his successful enterprise of river conservancy, began to map the Empire, locating its mountains and rivers, and dividing it into nine provinces.

Subsequent emperors extended the Empire north and southward, and military expeditions were despatched to conquer and subdue many tribes in the different parts of the present provinces of Honan, Chili, and Shensi. But in 770-255 B.C. China passed through her feudal period, and about five hundred principalities under the nominal suzerainty of the reigning dynasty of Chow fought among themselves and over-ruled the Emperor until 255 B.C., when the Prince of Tsin, west of Singanfu, in the present province of Shensi, destroyed all the other principalities and overthrew the Emperor.

The new dynasty, under the so-called "First Emperor," extended its territory from the Yellow Sea in the east to the Min branch of the Yangtze River in the west. The northern boundary went beyond the Great Wall, which was built by this enterprising sovereign to impede the tide of a threatened Tatar invasion. The Wall at that time began,

as it does now, at Shan Hai Kwan and ended at Kanchow, after running through Lin Wu and Yen An, the further extension being undertaken by another Emperor at a much later period.

The southern boundary of the First Emperor of Tsin was at the beginning of his imperial reign roughly coincident with the course of the Yangtze River; but having consolidated his dominion in the north, he crossed the river and incorporated the southern kingdom of Peh-Yu into his empire. The exact boundary in the south is nowadays not traceable, but historians agree that it went as far south as the present French colony in Tongking. Allowing for inaccuracy, I put the boundary as running across the present province of Kweichow and Kwantung to terminate at the Gulf of Hainan. Having abolished the feudal system, the First Emperor divided the Empire into forty districts, each under his direct personal rule.

In B.C. 140-86, under the Han dynasty, which succeeded the Tsin, a people living in Mongolia, commonly known to the Chinese under the name Hsiung-nu, whom some French sinologues identify with the Huns, raided the northern frontier of China. The martial Emperor, by his military success, pursued them far north and captured the districts north of the then Great Wall between Lanchow and Yü Lin. The inhabitants of the parts of the present Szechwan, Yunnan, Kweichow, who were then known to the Chinese as South-Western barbarians, were subjugated and put under Chinese rule. It is important to mention that in this period the Chinese first became acquainted with the countries west of the Bolor Mountains. General Changkien visited the countries of the Yaxartes and Oxus, and opened up communication between China and the kingdoms of the west. "Thus the Chinese," as Mr. Bretschneider points out, "were acquainted with the nations who now profess Islam, long before Mohammed had made his appearance."

China, though she is now a united country in the Asiatic continent, has from time to time been divided into many sections under rival rulers. In fact, a divided China has given greater stimulus to the energy and intellect of strategists, diplomats, and geographical explorers. It is only human nature that men are forced to activities by the pressure of circumstances, and that a united people, with a most favourable climate and possessing a most productive soil, and surrounded by no other civilised races is likely to deteriorate in energy and virility.

In the period A.D. 221-265 China was divided into three kingdoms, which I call for the sake of convenience the Northern, the Southern, and the Western Kingdoms, and I shall try to show the strategical importance of the mountain chains and the river basins in China when modern means of transport were not known.

Early during this period it was proposed by the Southern king to make an alliance with the Western, so that in the event of a joint operation against the Northern Kingdom one army should march from Chengtu across the Ta-lin-shan Pass towards Shangyang, and another army should march from somewhere near Anking towards Sui-Chung on the Hwai-ho River; and a third army march across it to the interior

of the Northern Kingdom. An attack from three directions on the enemy north of the Yangtze River would probably be too formidable for the Northern Kingdom to resist. On the other hand, if the Western Kingdom were allied with the Northern to attack the Southern Kingdom, Ichang would be then exposed to enemy attack from the north as well as from the west. "Ichang," said a Southern general, "is easy to defend but also easy to lose." And its loss would mean the loss of the whole provinces of Honan and Hupeh, because the wooden war vessels from Chengtu would then come down stream and pass the Ichang gorge at the rate of twenty knots per hour, and any naval resistance against such a torrential stream was hopeless.

After some ten years of ceaseless struggle, the Northern Kingdom got the upper hand over both the Western and the Southern Kingdoms, and the strategy adopted by it to subdue them was first to get hold of Chengtu, whence the Yangtze ran eastward. It was then suggested that the Western Kingdom should hold at any cost the mouths of the Han and the Kia-Ling Rivers, as they, on the one hand, commanded the channels of the downward stream, and, on the other, the Tsing-lin-shan and the Ta-pa-shan passes. Having failed to do this, the Western Kingdom was attacked from two directions, one from Kansu towards Lungan and another from Shansi towards the mouth of the Han River.

Having subdued the Western Kingdom, the Northern victor had no difficulty in crushing the Southern Kingdom, whose navy, though hitherto strong, was rendered powerless to resist when the upper stream of the Yangtze River fell into the hands of the enemy. The dependence of the navy on the defence of the towns up the streams may be illustrated by this poem :—

"When Wang Chung's battleships sailed down from I-chow,
The Royal spirit of Nanking suddenly shrunk to nothing.
When the thousand-cubit iron stakes were fastened in the river-bed,
Immediately there appeared at the Stone Castle the single flag of surrender."

I have to pass very rapidly through our historical records, as it will be neither possible nor desirable to examine here all the geographical changes that take place in our history. By the end of the tenth century A.D., at the end of the T'ang dynasty, China had conquered the region north of the Gobi Desert, which was then said to be under the Turkish rule: she had also incorporated into her Empire several States tributary to the Turks in the region near Lake Baikal who were known to the Chinese under the names "Sui yi tao and Shi-Yü." Korea had also been placed under the nominal rule of China. But unlike the Turkish or other ancient Colonial empires, the Chinese have never subjected the conquered subjects to severe measures. The vanquished races were admitted to the same status and the same treatment as the Chinese, and the conquered territory was always given self-government. But the conquered tribes have from time to time endeavoured to raid China, and at times have succeeded in ruling parts or the whole of the Celestial Empire for various lengths of time. The dynasty of T'ang set up many

governorships to govern the conquered regions, and some of these posts were hereditary and held by natives. I am unable to say in what respects these governor-generalships were similar to the Turkish pasha-lik, but the Tang dynasty, like the Ottoman Empire, suffered from the excessive power of these governor-generals, and finally succumbed to their revolt.

For the first time, Tibetans now invaded China, and several important towns in the provinces of Szechuan and Shensi were lost. Uigurs joined them in the invasion, and got so far as the eastern frontier of Shansi. Kitans or Kara-kitai of north-eastern Asia also invaded China, and with their army marched as far as the Yellow River. But the Kitans, while at the zenith of their power as invaders of China, had other enemies to face. The Golden Hordes, a tribe known to the Chinese as Nuchens, who had hitherto inhabited the region of the Ever White Mountain at the source of the Yulu River, had now become formidable after having absorbed several neighbouring tribes. An army was sent by them to attack the Kitans, and captured many Kitan towns.

The much troubled government of the Chinese Sung dynasty sent over a mission across the Gulf of Peichili to the Golden Hordes, with the object of planning an attack on their common foe, the Kitans, from both north and south, but the Golden Hordes were too diplomatic to be taken in. After their conquest of the Kitan Empire, they captured from the Sung several provinces, including Honan, where the Chinese capital was then situated.

The measures of offence and defence there adopted or recommended for battle in this time again illustrate my contention that to defend China, soldiers as well as sailors in older times always resorted to keeping hold of the upper stream of the Yangtze. It was then held that, though the eastern and southern provinces on the eastern coast at the end of the Yangtze River were far from the enemy and suitable for the seat of the Chinese Government, the north-western provinces and the basin of the Tungting Lake were the key to the whole situation, because it was possible to recapture the provinces at the end of the river by sending a fleet down the stream from the upper part of the river (west of the Tungting Lake), but not by sending a fleet against the current.

The military routes of the invasion of China by the Golden Hordes were roughly three. An army marched through the northern plain and crossed the river to capture the capital of Honan, but did not succeed. Two armies were afterwards despatched—one from the north of Tai Yuan and another from Chengchow—to make a concerted attack on Kaifong-fu, whence, after its fall, armies marched along the Yellow River to occupy Shensi. After another year, the same armies crossed the Hwai River, and drove the Sung Emperor from Yangchow to Chinkang and then to Hangchow.

While the Golden Hordes and the Chinese dynasty of Sung were struggling for rule over the Celestial Empire, the Mongols came in to oust them both. The great conqueror, Genghis Khan, was now dead, but his successors, Mangu and Kublai Khan, having conquered Korea, Tibet, and Annam, began to absorb the Chinese Empire. After seventy

years of reign, the Mongol dynasty in their turn succumbed to the revolts of many military leaders and brigands. After thirty years of internal struggle, China was in 1368 united under the dynasty of Ming.

I must not trouble you further with the historical changes of our geography, except for the fact that, in 1660, the conquest of China by the Manchus brought the whole of Manchuria under the dominion of the Chinese throne, and that in the seventeenth and eighteenth centuries China conquered Kokonor, and the Tanguo tribe. The present Chinese Republic comprises the eighteen provinces of China Proper, three provinces of Manchuria, Inner and Outer Mongolia, Chinese Turkestan and Tibet. The fusion of these different parts in the Republic is symbolised in our National Flag, which is made of five stripes. The first stripe, red, represents the Chinese Proper; the second, the yellow, represents the Manchus; the third, the blue, represents the Mongols; the fourth, the white, represents the Mohammedans in Chinese Turkestan; and the fifth, the black, represents the Tibetans.

The Social, Industrial, and Political Progress of China.—In dealing with this part of my paper, I must apologise for the unsystematic way in which I treat the subject. My excuse is the difficulty of getting photographs and statistics to show recent developments in my country. I shall, however, endeavour to say as much as time permits on water transport, on railway development, on the occupations of the people, and, to complete the social picture, a few words on education, on the army, and on the political situation.

China is irrigated by three rivers—the Yellow River, the Yangtze River, and the Western River. Of the three, the Yangtze traverses the most fertile region, and is the most navigable. The Western River is almost as important to Southern China as the Yangtze is to Central, but the Yellow River, though it has historical interest and is the cradle of our civilisation, is hardly useful to the economic life of China. It begins at the Tibetan Plateau, and passes through the loess region in the north-western corner of China Proper. In its lower half it carries much sand and mud. The deposition of this raises the river bed, and in course of time makes the river change its course or break its embankments.

The Chinese Government has since very early times paid great attention to the river embankments. But an embankment built with wattles and sand, and without scientific knowledge, is hardly solid enough to resist the pressure of floods.

With the rise of the Yellow River, all the minor rivers and canals connected with it also rise. The Wei-ho, the Pei-ho, and the northern portion of the Imperial Canal often suffer from this. In fact, only three or four months ago, the report came from China that Tientsin was submerged in water. This is not an uncommon experience.

River conservancy and the scientific construction of embankments remain to be carried out in China. Experiments have, however, already been made in several parts, and all have been proved very successful. As an instance, the course of the Hai-ho River, which passes through

Tientsin, has been shortened, and consequently the traffic through it much facilitated. At several points the distance has been reduced to one-third, and ships, instead of going round the three sides of a square, now only go through one side of it to reach the same destination.

In Northern China the winter is very severe, and rivers and canals all freeze. Ocean-going steamers from Shanghai to Tientsin have to suspend their usual voyage during the three winter months, and passengers to Tientsin have to divert their journey to Ching Wangtao, and thence take a train to Tientsin.

Only the rivers in the north freeze in winter. Those in the south are practically navigable all the year round. On the most important river of China, the Yangtze, ocean-going steamers of about 5000 tons can sail as far up as Hankow. West of Hankow the river becomes too narrow for big steamers to navigate, and only small steamboats run from Hankow to Ichang, and sometimes even to Chengtu. The Western River is also navigable for a long distance from the port at Canton.

Water transport in China would not have been so important if it were confined to these three big river systems. Without much exaggeration, I might say that nearly every town or village is connected with a river by some sort of canal. The longest canal is, of course, the Imperial Canal, built in fourteenth century by the Mongol Emperor, Kublai Khan. It runs through a distance of about 600 miles, and connects the Pei-ho River in Tientsin with the Chientang River in Chekiang. There are also in different parts of China numerous smaller canals, the names of which you do not find in maps, but the usefulness of which is appreciated by the Chinese.

Grand Canal in Tientsin, where steamboats have been introduced and new harbours made.

On the Grand Canal, and on some other canals, the traffic is very congested. Up to quite recent time river traffic was exclusively carried on by junks. The speed of junks depends very much on the current of the stream, and consequently also on the direction of the wind. Down stream a junk may sail at the rate of two or three miles per hour, but when it sails against the stream the speed will be much reduced, and the force required to move it is very great. In unfavourable weather junks have to be hauled and towed by men on the bank. The towing of ships from the bank is, of course, not peculiar to the Chinese. You

find it in the Midlands in England, but the difference is that here you use horse power more than we do in our own country. The cheapness of human power in China perhaps accounts for the difference.

Railway developments in China, as I hope to show in a minute or two, have already made great strides, but river traffic remains important; and I have reason to believe that even when railway systems have spread over the whole country, river traffic will always be a very useful and essential means of communication. Recently, steamboats have been introduced on almost all our rivers and a good many canals. In fact, in the upper part of the Yangtze and on the Grand Canal, steamboats have replaced junks to a very large extent.

In many towns on the rivers and on the canals, new harbours have been built to meet the new situation. In and about them, commercial activity is at its height. Loading and unloading are, of course, the most common events in these places; but the energy, the cheerfulness, and the capacity for hard work of the Chinese will probably fill casual visitors with amazement and joy. In short, in Tientsin, in Shanghai, in Canton, and in several other commercial towns, you will find that they are as pushful as Chicago, as noisy as Liverpool, and as distasteful as the East India Docks at the east end of London.

Across rivers or canals there are bridges, and bridges in China have always been an important means of communication because of the absence of railways and of the ubiquity of canals. But the transformation from the old type of bridges to the new is again very remarkable. Our forefathers built most ingenious and artistic bridges, such as bamboo suspension bridges and roofed wooden bridges, but the modern Chinese have rivalled their ancestors in the construction of more solid and more serviceable forms.

Canals in China are not only means of communication but also of irrigation. In the fertile regions, the same piece of land produces two or three staple crops per year, and the irrigation of the soil depends very much on the propinquity of canals. The cultivation of rice requires specially moistened soil, and our farmers, though they are ignorant of scientific methods of irrigation, know thoroughly well how to take advantage of Nature's gift. Ingenious and effective wheels are set up on the banks of the canals to draw water into the field, and wheels are turned either by human feet or by wind-force.

In China there is, of course, no waterfall comparable in majesty and in force to the Niagara, but falls of considerable size are found in many places on the rivers, especially on the upper part of the Yangtze. Advantage could be taken of these waterfalls to produce power and electricity to develop the country.

I must now say a few words on railway developments in China. Some of you will probably recollect that twenty or even fifteen years ago, the superstition and the religious beliefs of the people were causes of obstruction to the introduction of railways. Railway lines had to pass through graveyards, which are found almost everywhere in China, and the public believed that the motion of the locomotives and the carriages would disturb the spirits of their ancestors, and thus bring ill-

luck to the living. I am glad to tell you that these kinds of superstition and beliefs are now entirely things of the past, and that during the last ten years we have actually seen something like a railway mania in China.

At the present we have about 7500 miles of railway opened to traffic. The main lines are the Peking-Hankow, Peking-Mukden, Peking-Kalgan, Tientsin-Pukow, Shanghai-Nanking, and the Shanghai-Hangchow-Ningpo. These lines are financed and constructed either entirely

by the Chinese or partly by foreigners, but they are all under the management of the Chinese Government.

Trade has increased by leaps and bounds in the regions served by these railways; and a good many small towns, the existence of which was hardly known ten years ago, have now become great centres of commercial activity. The operating revenue of all the lines in 1913 was $39,420,686, and the operating expenses $22,774,523. The proportion of net revenue to total capital is 8·3 per cent.

In addition to these lines, there are on Chinese territory railways owned and managed by foreign powers, such as the Chinese Eastern Railway of Russia, the South Manchurian Railway of Japan, and the Kiaochow-Tsingnanfu Railway of Germany.

Railway development in China, though it has made a beginning, is still at its infant stage. Japan, with an area of 163 thousand square

miles and a population of 42 millions, has 4000 miles of railways, or roughly one mile of railway to every 38 square miles of territory and every 10 million people. But China, with an area of 1800 thousand square miles and a population of about 380 millions, has only 7500 miles, or roughly only 1 mile of railways to 350 square miles and 77 millions of people.

The need of railway extension is obvious. Arrangements have been made by the Chinese Government with foreign financiers to build several important lines, as the dotted lines on the map show. The lines from Haichow, on the Eastern Sea, to Kansu was to be financed by a Belgian Syndicate and staffed by Belgian engineers, but the outbreak of the war has prevented the Belgians from executing the plan in time. Several other similar arrangements have been made with British and French banks, but the war has paralysed these enterprises. It is hoped that a line through Chinese and Russian Turkestan will bring Petrograd within five or six days' journey of Peking. London will then be connected with Australasia by railways through the European and the Asiatic continents, and by a sea journey from Shanghai or Canton to Sydney: and the time then required will be only two weeks and a half instead of six. China, I think, will have to rely on foreign markets for new capital, a land of small-farmers having no capitalistic class.

With the development of railways, new occupations have arisen for the inhabitants. Factory-life has become very common in China, and smoky chimneys and noisy wheels run by electric or steam power are found in many districts. There is a paper-mill near Shanghai, owned and managed entirely by the Chinese without any assistance from foreign experts, while at the Hanyang Iron Works and Arsenal, steel of the best quality is produced, and arms of the most up-to-date design are manufactured for the Chinese army.

Wuchang Arsenal.

Women have recently also changed their position. Feminine seclusion is no longer maintained, and the education of girls has lately witnessed a marvellous development. In older times women were engaged in spinning, weaving, and tea-picking, but in modern factories female labour is very extensively employed.

In almost all the principal towns, and in many villages, higher technical colleges as well as elementary schools have been established to train our women. The teachers here are generally men, because women teachers are difficult to get. You will realise how thoroughly the old barrier between men and women has been broken down. The Chinese pay

very great attention to the physical training of schoolgirls, and, finally, you must not be suprised to find that our women take an active part in our civil wars.

Our army has been thoroughly reorganised on modern lines, and is now equipped with modern weapons. The old type of soldiers wore sandals, and carried bows and arrows; they knew nothing of modern discipline and warfare. Towards the end of the last century the Chinese army was re-equipped. Soldiers were taught to fire rifles. But the establishment of the Republic marked a further advance in the organisation and equipment of our army. The Chinese troops of to-day have been trained on European lines and sometimes by European officers.

A word or two on the current political events in China to conclude my lecture.

The Revolution in 1912 resulted in the establishment of the Republic. Since then the country has seen much internal disturbance, and the North and the South are now in armed conflict. But the Chinese, according to their traditions, are always ready to compromise in their quarrels, and I have reason to expect that compromise will eventually hold the different parts of the country together.

The development of railways will shorten the distance between the different provinces, and will enable the Central Government to exercise a more effective control over them.

Representative government has been introduced into China, but unless people are sufficiently educated to form a real and genuine public opinion, representative government then tends to become a tyranny by the representatives. Federation may provide a means to develop the vast country, but centralisation is still more urgent. The future of China lies in her economic development and in her popular education. These problems have already been attacked in a perfunctory manner, but more remains to be done. I conclude my lecture with the hope that disinterested and sympathetic friends of China in Scotland and England will always extend to China a helping hand in her times of difficulty.

THE NEW PARLIAMENTARY DIVISION OF SCOTLAND, UNDER THE REPRESENTATION OF THE PEOPLE ACT, 1918.

Probably no revolution was ever effected more quietly than by the passing of the Act of 6th February last, which, it is expected, will increase the Parliamentary Electorate of the United Kingdom from a little over eight to almost sixteen and a half million of voters—six millions of whom will be women. An admirable Report by a specially appointed Boundary Commission for Scotland preceded the passing of the Act, and will be found in the Society's Library.[1] The present notice is based upon its terms.

[1] *Report of the Boundary Commission (Scotland).* Presented to Parliament, 1917. Price, with a Map of each Constituency, 8s. net.

According to the Secretary for Scotland's instructions to the Scottish Boundary Commissioners, they were to divide the population of Scotland in such a manner as to give one Member of Parliament for each population of 70,000, and for every multiple of 70,000, and an additional member for any remainder which was not less than 50,000.

In carrying out these instructions, the Commissioners divided Scotland into the following separate constituencies: and their Report was agreed to by Parliament with a few unimportant amendments which are given effect to in this summary of its terms:—

	Estimated Population 1914.
County of Aberdeen and Kincardine. 3 Members.	
Central Division,	65,701
Eastern Do.,	64,751
Kincardine and Western Division,	47,931
Divided Parliamentary Burgh of Aberdeen. 2 Members,	163,044
North Division,	78,084
South, Do.,	84,960
County of Argyll. 1 Member,	64,354
No Parliamentary Burghs.	
County of Ayr and Bute. 3 Members.	
Bute and Northern Division,	73,473
Kilmarnock Division,	72,124
South Ayrshire Do.,	65,754
Ayr District of Burghs. 1 Member,	69,101
(Ayr, Ardrossan, Irvine, Prestwick, Saltcoats, and Troon.)	
County of Banff. 1 Member,	58,453
No Parliamentary Burghs.	
County of Berwick and Haddington. 1 Member,	70,481
No Parliamentary Burghs.	
County of Caithness and Sutherland. 1 Member,	48,739
No Parliamentary Burghs.	
County of Dumbarton. 1 Member,	74,946
Dumbarton District of Burghs. 1 Member,	65,100
(Dumbarton and Clydebank.)	
County of Dumfries. 1 Member,	69,437
No Parliamentary Burghs.	
County of Fife. 2 Members.	
Eastern Fife Division,	70,211
Western Fife Do.,	75,446
Dunfermline District of Burghs. 1 Member,	58,274
(Dunfermline, Cowdenbeath, Inverkeithing, and Lochgelly.)	
Kirkcaldy District of Burghs. 1 Member,	67,436
(Kirkcaldy, Buckhaven, Methil and Innerleven, Burntisland, Dysart, and Kinghorn.)	
County of Forfar. 1 Member,	47,767
Parliamentary Burgh of Dundee. 2 Members,	176,838

	Estimated Population 1914.
Montrose District of Burghs. 1 Member,	51,773
(Montrose, Arbroath, Brechin, Forfar, and Kirriemuir, with Inverbervie in Kincardine County.)	
County of Galloway. 1 Member,	66,489
(Counties of Kirkcudbright and Wigtown.)	
County of Inverness and Ross and Cromarty. 3 Members.	
Inverness Division,	65,956
Ross and Cromarty Division,	44,330
Western Isles Do.,	44,683
No Parliamentary Burghs.	
County of Lanark. 7 Members.	
Northern Division,	70,241
Coatbridge Do.,	67,540
Rutherglen Do.,	71,990
Hamilton, Do.,	64,592
Bothwell Do.,	71,675
Motherwell Do.,	68,596
Lanark, Do.,	61,975
Parliamentary Burgh of Glasgow. 15 Members,	1,053,926
Bridgeton Division,	77,000
Camlachie Do.,	74,500
Cathcart Do.,	67,500
Central Do.,	66,500
Gorbals Do.,	90,500
Govan Do.,	68,500
Hillhead Do.,	54,000
Kelvingrove Do.,	76,500
Maryhill Do.,	71,000
Partick Do.,	57,000
Pollok Do.,	60,000
St. Rollox Do.,	77,000
Shettleston Do.,	68,500
Springburn Do.,	74,000
Tradeston Do.,	71,500
County of Linlithgow. 1 Member,	80,344
No Parliamentary Burghs.	
County of Midlothian and Peebles. 2 Members.	
Northern Division,	54,045
Peebles and Southern Division,	49,892
Parliamentary Burgh of Leith. 1 Member,	80,241
Parliamentary Burgh of Edinburgh. 5 Members,	341,057
Central Division,	71,190
(St. Giles', George Square, and St. Leonard's Wards.)	
East Division,	58,495
(Canongate Ward, Portobello, and Musselburgh.)	

	Estimated Population in 1914.
North Division, ... (Calton, Broughton, St. Stephen's and St. Andrew's Wards.)	68,750
South Division, ... (Newington, Morningside, and Merchiston Wards.)	67,588
West Division, ... (Gorgie, Haymarket, St. Bernard's, and Dalry Wards.)	75,034
County of Moray and Nairn. 1 Member, . .	49,817
No Parliamentary Burghs.	
County of Orkney and Zetland. 1 Member, .	50,501
No Parliamentary Burghs.	
County of Perth and Kinross. 2 Members.	
Perth Division, ...	73,238
Kinross and Western Division, . . .	53,225
No Parliamentary Burghs.	
County of Renfrew. 2 Members.	
Eastern Division, ...	60,099
Western Division, ...	59,852
Undivided Parliamentary Burghs:	
Greenock. 1 Member, ...	77,642
Paisley. 1 Member, ...	86,593
County of Roxburgh and Selkirk. 1 Member, .	68,259
No Parliamentary Burghs.	
County of Stirling and Clackmannan. 2 Members.	
Clackmannan and Eastern Division, . .	69,818
Western Division, ...	54,183
Undivided Parliamentary Burgh:	
Stirling and Falkirk District of Burghs. 1 Member, ... (Stirling, Falkirk, and Grangemouth.)	65,234

By the foregoing statutory division, Scotland was allotted 71 members of Parliament, whereof 38 represented counties and 33 parliamentary burghs or districts of burghs. As Scotland was also, under the Act, to have 3 University members (by means of a combined University constituency of the Universities of St. Andrews, Glasgow, Aberdeen, and Edinburgh), her total representation in Parliament would be 74 members, or two members more than formerly.

With regard to the political effect of the above geographical distribution of Scottish members of Parliament, it is plain from the foregoing division that the county of Lanark, with its 7 county and 15 Glasgow members, or 22 in all, will possess a preponderating parliamentary influence as compared with that of other counties.

As the bulk of the population of the country lies in the Scottish Midlands, we are not surprised to find that the counties and burghs of Lanark, Dumbarton, Ayr, Renfrew, Midlothian, Linlithgow, and Stirling

and Clackmannan, with their united 44 members, contain considerably more than one-half of the parliamentary representation of Scotland. At the same time, the division has been so carefully and fairly made by the Commissioners, that the rest of Scotland has no cause to complain, as even its remotest districts have been allotted an adequate number of members.

Some attractive novelties in the designation of constituencies (while also refreshing recurrences to ancient designations) have been introduced by the Commissioners, such as applying the term "Western Isles" to the new constituency of the Outer Hebrides, and that of "Galloway" to the counties of Wigtown and Kirkcudbright, besides substituting the term "Moray and Nairn" for the former one of "Elgin and Nairn Shires." They have also avoided the solecism of adding the suffix "shire" to such complete place-names as "Argyll" and "Fife."

In such an extremely difficult task as to divide Scotland into seventy-one fairly equal constituencies, the Commissioners have shown such skill and judgment that no locality can feel itself aggrieved. Proceeding on the only equitable basis, that of population, the Commissioners allotted constituencies according to the instructions they had received from the Secretary for Scotland. In the process of forming constituencies from populations, the latter occasionally vary considerably, from Ross and Cromarty and the Western Isles, each with a population of a little over 44,000, up to Gorbals, Glasgow, with its population of 90,500. But it has always been held that the more remote districts of Scotland should, considering their remoteness, inaccessibility and great extent, have special opportunities of being represented in Parliament; and it may be safely concluded that none of the fifteen members of Glasgow will grudge the two seats awarded to the places mentioned in the far North, although the populations of the latter cannot compare with those of their own constituencies.

This notice being confined to the purely geographical distribution of constituencies made by the Commissioners, the legal qualifications of voters are not referred to. As the Registers of Voters under the Act are not to be definitely published till October 1918, we shall not know till then the precise number of men and women who will be qualified to vote in each constituency.

RALPH RICHARDSON.

TRAVEL MEMORIES.[1]

By Lieutenant-Colonel A. C. YATE, F.R.G.S., F.R.Hist. Soc.

(*With Illustrations.*)

WHEN I last laid down my pen, five months ago, my brother and I were riding into Kumeshah to spend the night of the 9th June 1881 at the telegraph bungalow there. Arrival at dusk and departure at dawn

[1] Continued from p. 113.

obviously leaves the wayfarer very much "in the dark." If the reader would "lighten the darkness," the pages of Chardin and Curzon are nothing if not luminous. I closed my last paper by a reference to Rawlinson and Chardin for pictures of a Persian pigeon-tower. Let me add Curzon, vol. ii. p. 18, in whose pages a glimpse of the past greatness of Kumeshah is afforded. It was in 1835 close to Kumeshah that that magnificent Scotsman (he stood 6 ft. 7 in.), Sir H. Lindsay-Bethune, who went first to Persia with Sir John Malcolm in 1808, led the army of Mahommed Shah, son of Fath Ali Shah, against the combined forces of the Shah's two rebel uncles, decisively defeated them, and by a rapid march to Shiraz secured their persons and thus nipped intestine war in the bud.[1] During the few hours which we spent with the telegraph inspector, Sergeant M'Intyre of the Royal Engineers, our conversation did not turn upon Persian history. Though thirty-seven years have gone by, the broad richly cultivated valley of Kumeshah, studded with villages and pigeon-towers and traversed by a tributary—the course of which we were to follow the next day, for fifteen or twenty miles—of the Zendeh Rúd, still looms dimly before my mind's eye. Sergeant M'Intyre had already completed a decade of service in Persia, and spoke the language fluently. Before we settled indoors, he took us to see his Persian greyhounds, and described some of his runs with them after ravine deer on the lower slopes of the neighbouring hills. Unless his hounds, he said, succeeded in overtaking and collaring the deer in the first burst, *i.e.* in the first hundred yards, they could rarely, if ever, run them down. Once among the uneven ground of the lower slopes of hills, the quarry easily shakes off pursuit, and on the plain the palm of speed equally lies with it. As for the speed of a horse, they laugh it to scorn. Any one also who has ridden over the plains of Persia, Afghanistan, Baluchistan, Sind, and the North-West Frontier Province of India, not to mention other parts, is witness of the ease with which the gazelle leaves the horse standing.[2] One of the best stories of a hunt to the death that I can recollect reading was that of "Nick" Symons (the brother of Major-General Sir Penn Symons, who fell mortally wounded at Talana Hill in 1899), after a Gujerat wolf. As sportsmen the Symons brothers ranked high. After a very stern chase "Nick" killed the wolf. My own experience of the kind is limited to a hyæna which

[1] Since I wrote this chance brought into my hands a book unknown even to Curzon, the privately printed Diary of H.R.H. Najaf Kuli Mirza, a son of one of the rebel uncles, styled Firmán Firmá, Governor-General of Fars. This young Prince, with two brothers, took refuge in England, and their rebel proclivities earned them experiences to which Persian royalty was at that time a stranger. They spent some months at Mivart's Hotel, apparently as the guests of H.B.M.'s Government. This book, translated from Persian into English, dedicated to Sir Gore Ouseley, and printed (n.d.) "for private circulation only," gives many details of the plot against Mahommed Shah's accession to the throne of Persia.

[2] For speed the wild-ass (Persicé, *Gúr*) is reputed to hold the record. The Persian plains, the Rann of Kach, and Mid-Eastern steppes are among its haunts. To all who know anything of Persian history and literature the sobriquet of one of the finest sportsmen of the Sassanian dynasty, Bahrám-i-Gúr, is familiar. He is said to have met his death in a quicksand, some thirty miles west by south of Dehbid (where we spent the night of 7th June 1881), while in hot pursuit of a wild ass.

I put up from a nullah in the plain five or six miles south of Chaman (between Quetta and Kandahar) in September 1902. The run lasted forty minutes. I carried only a light cane, so a solid stone dealt the *coup de grâce*.

Sergeant M'Intyre's residence at Kumeshah was a model of neatness, and his Ispahan wine and home-made cherry brandy excellent. The latter was made, he told us, from the small sour black cherry (الووالو =alúwalú) and from arrack (عرق). The Persian arrack (عرق), he explained to us, was a spirit distilled from the skins of grapes which had previously been pressed for the making of "shíra" (شیرد), a kind of syrup. I gather from my diary that we heard from him the usual story of the mal-administration of the country and of the iniquitous methods pursued in the levying of taxation. Regarding the latter my diary records: "It appears that, although lands and tenements are, theoretically or nominally, assessed at a definite rate, in practice that rate may be levied several times during the year." Anatole France's Socialist cynic, M. Choulette (*Le Lys Rouge*), may exclaim, "Quel fruit tirer d'un sol imposé à trente-trois pour cent du revenu net?" M. Choulette did not know Persia. The issues of the present war, as regards Persia, are at this moment probably approaching their most acute phase. The last letter which I have received from South-East Persia, after a voyage of two months or more, draws a gloomy picture of affairs in that country. By roundabout channels some few facts filter through. We ought, as Sir Paul Vinogradoff has pointed out in *The New Europe* (No. 86, p. 177, of June 6, 1918), in few but emphatic words[1]—words which Colonel Rodzianko endorsed, though from a somewhat different standpoint, in the *Times*, of 7th June, and which all qualified to know judge to be sound—to make at once Persia a *point d'appui* for resisting the advance eastward from Asia Minor and from the Black Sea and Caucasus of the Turk and the Teuton. Such a resistance will naturally be based upon Baghdad, Basra, and Mohammera, and in a certain measure, also, doubtless, upon Quetta, between which great garrison and Persian Sistan communications have been greatly improved. Meanwhile "India's Man Power," as suggested by St. Nihal Singh, in the *Contemporary Review* for June 1918, is being developed. Half a million is the proposed increase of strength of the Indian Army. There is hope in this for Persia. The position held by the Tigris Army is invaluable, and must at all costs be maintained.

The "Pan-Turanian" movement is in the air, but if anything can place a barrage between the Sunni Turk and the Moslems of Central

[1] "The first requirement is to create a basis for operations by establishing *points d'appui* for military stores and opening up lines of contact with the Russian people. Convenient centres are indicated by geography, and are partly equipped even now. I mean, primarily, the Murman line and Archangel; in a lesser degree, Vladivostok and the Manchurian railway; in the future, possibly, the Persian front." I do not endorse "possibly." I maintain that British troops, supported by all that is loyal to the Allies in Persia, should have months ago been opposing the Turks, who are the van of the "Drang nach Osten," and supporting the Georgians and Armenians.

Asia and China, it is the Shi'a faith of Irán. It would be a relief to know that Britain was forming in Persia that rallying-point for the Persians which, all feel, the Allies should long ago have been forming in Siberia for the emancipation of Russia from Bolshevism.[1] Some thirteen years ago, when I was an inmate, on my return from India, of Sister Agnes's Hospital for Officers at 9 Grosvenor Gardens, I met a field officer just back from Persia. There he had been attacked by brigands, and, though he escaped with his life, his arm had been shattered by a ball and had to be reset. He is now, I hear, back in Persia and rendering good service to British interests there.

It was in Sergeant M'Intyre's house that I first saw a copy of the Persian edition of Shah Nasir-ud-din's Diary of his visit to Europe in 1873. It has been translated into English and French; but, after seeing the illustrations of the Persian edition, I am not surprised that Mr. J. W. Redhouse limited his "verbatim" reproduction of the work to the letterpress, with a good portrait of the Shah as frontispiece.

"Kumeshah is a large closely packed town surrounded by mud walls. Like many others since the famine, it is half-ruined and half-populated" (Diary). An eyewitness of the heartrending scenes and cold-blooded iniquities of this famine was Major Oliver B. St. John in 1870 to 1872, and what he witnessed is told in Sir Frederick Goldsmid's *Eastern Persia*, vol. i. pp. 94-98 and 361. Every British child, thanks to Southey, knows the legend of Bishop Hatto and the Mäusethurm. If Persian ballad-writers have not equally handed down to infamy the memory of the Imám-i-jum'a (Archbishop) of Ispahán, and of Rahim Khan, the principal customs officer, then the ballad poetry and the museums and schools of Persia are the poorer, and just retribution has been robbed of its due.

At 5·50 A.M. on the 10th of June, accompanied by our host, we left the Kumeshah telegraph house, and, after riding for a short distance through the town, emerged into a well-cultivated country. About two miles from the town we passed a Masjid, prettily situated amid trees, orchards, green fields, and running water, to and from which crowds of pilgrims, male and female, were moving. There our host left us, to go in and have a chat with the mullahs, it being Friday, the Mohamedan Sabbath. On Thursday evenings, one was told, the road between Ispahan and Kumeshah, distant from each other about 50 miles, swarms with Moslem worshippers bent on paying their devotions to one or other of the mosques or shrines with which the neighbourhood abounds. Seven or eight miles from Kumeshah our road struck eastward, quitting the fertile valley of the tributary of the Zendeh Rúd (=river), along a barren valley to the Mayar posthouse, which we reached in two hours. Our postboy with the heavy kit came in at 8.10, twenty minutes after us. We were off again on fresh horses at 8.35, and reached Marg at 10.55, kit arriving at 11.20. For this stage I had had a capital horse, about 14½ hands high, and noted as a runaway. I was warned of this the night before.

[1] The power and will of Japan to intervene is set forth in a telegram of 11th June from Tokyo, which appears in the *Times* of 15th June last.

When I fitted my single-rein snaffle into his mouth in the morning, I almost wished that I had not left the curb behind me. I had been told that the last British traveller who had mounted this horse had been carried from Mayar to Marg (about 22 miles) in one hour and twelve minutes. I myself, keeping the horse well in hand all the time, could have covered that distance easily in 1½ hours. I was, with my saddle-bag, riding about 16 stone. For a mile or two after starting I had to be on the *qui vive*, and once he all but got away with me, and then he settled down into a perfect action and pace. It was for his sins, *i.e.* his runaway habit, that he was sold to the Persian post-office. His spirit would very soon knuckle under to that life. I so thoroughly enjoyed my gallop from Mayar to Marg that I took the same horse on from Marg to Ispahan, but the extra seven or eight miles rather tired him, though we rode quietly. Leaving Marg at 11.45, we reached the mission-house at Julfa, the Armenian quarter of Ispahan, just at one o'clock From the summit of a low spur, halfway between Marg and Ispahan, we had a fine view of the city and valley—a valley of great extent, a patchwork of tilled and untilled land, in the midst of which reposed the motley half-ruined old city with its domes and minarets, palaces and bridges, river and gardens, avenues, bazaars, and inscrutable (except from above) dwellings. Whether we recall it as the metropolis of Shah Abbas, to whom our Queen Elizabeth sent ambassadors, or as the scene of the exploits of James Morier's immortal creation Hadji Baba, it is around Ispahan that the glamour of Persian legend and life seems to gather. The Diary which I kept during our journey of 1881 sets before me seventeen closely written foolscap pages devoted to what I saw and heard during a stay of eighty-four hours in the hospitable mission-house at Julfa. I saw, of course, all that travellers usually see. To such sights and historic scenes justice is done by Chardin, Lord Curzon, and Mr. Bradley Birt, and by many, many others. "Travel Memories," which hinge upon a journey made thirty-seven years ago, should be lubricated with some up-to-date unguent. Still it is a pleasure to remember that in June 1881 [1] we found Mr. Agenor, an Armenian holding the post of British Agent, waiting just outside the walls of Julfa to greet us on arrival and to conduct us to the mission-house. It was an act of courtesy which appeals to us to-day as strongly as it did then.

Our host, in the absence of Dr. (afterwards Bishop) Bruce,[2] was Dr. Hörnle. We were glad to rest that day. The Assistant Superintendent of Telegraphs, Mr. Höltzer, himself ascertained for us that the Caspian steamers left Enzelli for Astrakhan every Saturday. Working out our stages at about 70 miles a day, we saw that we must leave Ispahan on the 14th in order to catch the steamer due to leave Enzelli on the 26th June. That settled, we had three days in which to "do" Ispahan. It was a luxury once more to sit down to a nicely laid table, with fruit and

[1] I write this in June 1918.

[2] I had the pleasure of meeting Bishop Bruce at the house of Major-General Sir Robert Murdoch Smith in Edinburgh on my return from the Tashkent Exhibition in the latter part of 1890.

Entrance to *Madrasa* (College) opening off the Chahar Bagh, Ispahan. The doors are plated with solid silver and studded with silver bosses. From a photograph taken by Mr. Höltzer in 1885.

"Chahár Bágh" Avenue, now nearly all cut down. Taken by Mr. Holtzer in 1885.

ice and good cuisine. The mission, we were told, got its annual supply of ice or frozen snow for one toman = 8 shillings. Cheap! is it not? And yet we were told this was the price which the rich paid. To the poor it was less. Ispahan is 5000 feet above sea-level, cold in winter, and under a very powerful sun in summer. "Our hands, wrists, necks, and faces were, when we arrived there, in a most painful state. It was with much agony and many groans that we underwent the ordeal of being shaved. It was more like being flayed alive. I could not bear a stiff collar or wristband to touch my neck and wrists, and so blistered were my lips that to smoke a cheroot was an impossibility, and even eating and drinking demanded circumspection."[1]

Of the Protestant Mission at Julfa and the admirable educational and medical work which it carried, and no doubt still carries out, I need not speak. The Roman Catholic Church was in 1881 represented in Julfa, and that by a priest of Armenian race who had travelled widely and spoke six or seven languages. The American Mission, we found, was at Teheran. Its sisters, we heard, did great good there. It was but the other day that, going into one of the innumerable branches of the War Office, which are now dotted about London, I was introduced to an Armenian gentleman, who spoke English correctly but with anything but an English accent. He told me that he had been educated at the American Mission at, I think, Tarsus. I would that my memory could recall all that he and his poor wife went through in recent years up to the time when Beyrout or some such Syrian port asked Constantinople for orders about him. The alternative was death or expulsion. The curt reply came—"Kick the dog out!" I have seen the suggestion made that the Persian Shi'a might amalgamate with the Turkish Sunni to promote the Pan-Turanian movement. A friend of mine, an accomplished Persian and Arabic scholar, and a lifelong resident in Persia, wrote to me three or four months ago: "If by any perverse turn of affairs the fusion of Shi'a with Sunni should become an accomplished fact, I shall cease to prophesy. To my mind the thing is not possible, but we have seen the impossible become the accomplished fact so often during the past three and a half years that it seems as if nothing was impossible in these days." As far as my experience goes, the blending of rival sectarian faiths is a most delicate process.

Dr. Hörnle, our host, had not been long in Persia, and was studying the language, as the church service was conducted in Persian. We much regretted having no opportunity of attending and personally witnessing that service. The translation of the Scriptures and the dissemination of Christian doctrine in "divers tongues" by missionary enterprise is one of the "Seven Wonders" of the modern world. I leave my readers to supply the other six. The first establishment of a Church of England Mission at Ispahan had to face the combined hostile forces of the Mulla, the Armenian, and the Roman Catholic. The Zill-es-Sultán, the first born son, but not the heir apparent, of Násir-ed-din Shah, was

[1] Extract from Diary.

himself favourably disposed towards the Anglican Mission, but the powerful influence of the Mullas constrained him to forbid the attendance of Musulman children at the Mission school, despite the fact that, at the outset, the parents had, in defiance of the Mullas, sent them there. The coal of fire which the Mission school laid upon the head of the Armenian opposition was the admission to its classes of Armenian children of both sexes. Seventy or eighty were in attendance in 1881. They were practical little people, and one or more of the girls made for me a nice light coat of white drill, of material woven in the art school of the Mission, which was a comfort to me during the intense heat which we had to face between Ispahan and Astrakhan on the lower Volga. It was a very wearable coat, though the cut and fit were not quite that of Savile Row.

"The boys are divided into three classes, under the instruction of three masters, whose standard of proficiency is proportionate to the capabilities of the pupils they teach. I remarked that almost all the boys could read and speak English fairly well, and were conversant with arithmetic. The more advanced boys studied Euclid and Algebra. In the Art or Technical School weaving only is at present taught. Webs of plain and variegated cloth, women's chādars, towels, coloured handkerchiefs are here manufactured, and a small shop maintained for their sale. Eighteen orphan Armenian children are also maintained and educated at the cost of the Mission; they looked well fed and well clothed, and as happy as children ought to be. They are looked after by an Armenian matron. In the school is a playground, with swings and other gymnastic apparatus, a tank for bathing, and shady trees for rest.

"The dispensary affords relief to a large number of men and women of all classes and persuasions. There are separate waiting-rooms for the two sexes. Seldom, I am told, are operations performed—but there is a large demand for medicines. In point of cleanliness, airiness, and general neatness, the Mission grounds and buildings were a perfect model, and it is very evident that the influence of this Mission on the present and future generations of Armenians (if its good work is not baulked by the prejudice of Musulman bigotry or the jealousy of Armenian self-interest) will be most beneficial. From what I gathered in the course of conversation, the present state of the Armenian Church in Julfa is far from pure and exemplary. In fact corruption and malpractice were said to be only too rife. I had little chance during my stay of gaining an insight into the Armenian character—but the little that I heard and saw did not impress me favourably. Morality among the women, and the parental regard for the honour of their female offspring must be at a low ebb, if it is true that parents will sell their female children for purposes of prostitution. The Armenian women in the streets wear a chādar drawn over their heads, and a white bandage across their chins, and many of them a silver belt round the waist, and their conduct appeared to be quite decorous. The eyes, nose, and mouth are not concealed at any time. I cannot say I was struck by anything but the universal ugliness of the women. I consider the Armenian type of feature far from prepossessing either in the men or

the women. But we must remember that the Armenians of Julfa[1] are a subordinate race, cowed and demoralised by several centuries of Musulman insult and oppression. I believe that Shah Abbas the Great settled the Armenian colony in Julfa in the time of our Queen Elizabeth. Julfa is divided into four Mahallas, each possessing a civil headman and a church. There are also a cathedral[2] and several other churches, and the chief authorities are a bishop, two monks, and a number of priests. The outdoor dress of the Armenian priests is a long black gown worn like that of the Romish priest. The ancient Armenian language, I am told, is as different from the modern dialect as Latin from Italian or Attic from modern Greek, and is only preserved in the translations of the Holy Scriptures, and a few other books. No extensive Armenian literature appears to exist. Our visit to the bishop, the cathedral, and several of the churches will be hereafter described. The ordinary priests can attain no higher dignity. Only the monks, to whom celibacy is obligatory, can rise to be bishops. Bishops are, I believe, permitted to marry. There is a monastery and a convent in Julfa.

"The male Armenian's dress closely resembles that of the Persians—but some few of them adopt a European style of dress. I am told the Armenians are excellent artisans. Their moral character, however, appears to be not one whit more elevated than that of the mass of Persians—and in truth one can hardly look for nobility of character or self-pride in a subject and oppressed race.

"Mr. Stack of the Indian Civil Service joined us at breakfast this morning. He had been travelling in Persia for some four months, and had already visited Shiraz, Firuzabad, Lar, Kirman, and Yazd, and was on the point of starting through the Bakhtiāri country and *viâ* Hamadan to Teheran. Before leaving India I had read many of his exceedingly well-written letters to the *Pioneer*. He is an excellent Persian scholar, and in his travels appears to have collected much information about the people and country, and also to have made many observations with a view to correcting the existing surveys and maps of Persia. I have since heard that he is about to publish an account of his travels in Persia, which terminated about the end of July 1881. He was travelling leisurely with his own horses, mules, servants, and escort, as well as a Mirza. The latter is a most useful companion, as he conducts correspondence with the authorities of the places that one visits, keeps accounts, obtains information, and generally relieves the traveller of all the worries of dealing with the natives of the country. He should also be a companion to the solitary traveller, as if well

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[1] From Malcolm's *History of Persia*, vol. i. chap. xiv., it appears that Shah Abbas the Great, who brought the Armenian colony from Julfa in Armenia to Ispahan, and settled them in the "Mahalla," named after their old habitation, treated these colonists with kindness and justice. This treatment, however, was not likely to be continued by the succeeding monarchs, and during the troublous times between the fall of the Suffavean dynasty and the rise of the Kajar they probably suffered severely from tyranny and oppression.

[2] *Vide* Curzon's *Persia*, vol. ii. p. 54, for picture.

educated his conversation is agreeable, and he can be referred to for information on many points."[1]

GEOGRAPHICAL NOTES.

Europe.

Variations in Existing Glaciers.—The subject of the advance and retreat of the existing glaciers of Europe is one to which much attention has been given of recent years. In the case of the French Alps observations were more or less interrupted during the years 1914 and 1915, but they have since been recommenced, and both there and in the Swiss Alps the great feature of the last year or two has been a notable advance. In 1913 of 100 glaciers in the Swiss Alps, 33 were advancing, 8 were stationary, and 59 retreating. In 1916 the figures were, 64 advancing, 8 stationary, and 28 retreating. In 1914 and 1915 the Rhone glacier, for the first time since 1856, showed an advance; up to 1910 it was steadily retreating. Nor is the phenomenon confined to the Alps. In Norway signs of an advance were apparent from 1903 onwards. But this advance seemed to attain its maximum in 1910 and 1911; in 1915 and 1916 almost all those studied showed signs of retreat. This is not the case in the French Alps, where the glaciers from the great Mt. Blanc *massif* seem to be steadily advancing, the Bossons having made the notable advance of 150 metres, or very nearly 500 feet, in the four years from 1914 to 1917. The advance of the French glaciers, however, is far less noticeable in the regions of Tarantaise, Maurienne, and Pelvoux, where the movements are irregular, some glaciers advancing to a moderate extent, while others are retreating. These facts raise a number of interesting general questions, discussed in two articles from which the above facts are taken. These are one by Professor Raoul Blanchard in the *Annales de Géographie* for March last, and one by Professor P. L. Mercanton of Lausanne in the *Revue Générale des Sciences* for November 1917. The latter gives an interesting historical summary of the more important variations of the Alpine glaciers in historical time, and discusses some general problems in regard to glacier movement. Professor Blanchard accepts M. Rabot's view that the present advance is probably a secondary variation, and is not to be regarded as the beginning of a great movement such as occurred in the Alps towards the end of the eighteenth century.

Asia.

The Holy Cities of Arabia.—Military events in the Hedjaz have to some extent broken down, during the last year, the complete isola-

[1] Quotation from Diary. Mr. E. Stack published in 1881 *Six Months in Persia*, in which he (to quote Lord Curson, *Persia*, vol. i. p. 22) "threw the graces of independent thought and a fascinating style over the novel area of his explorations." An early death cut short Mr. Stack's career of promise.

tion of the Holy Cities of Arabia from the Western world. M. E. F. Gautier devotes to them a most suggestive article in the *Annales de Géographie* for March 15, based upon a visit to Jedda, the port of Mecca, and apparently also to Yambo, the port of Medina, and upon information obtained upon the spot, and from other recent visitors. At both the ports Allied Military Missions have been in residence since the end of 1916, and the effect of their presence upon the people is said to have been noteworthy, especially in breaking down the old intolerance of Christians.

Among other changes the so-called "tomb of Eve," near Jedda, can now be visited without difficulty. It presents some points of much interest. The form is rectangular, very long in relation to the breadth, with three stones, one at the "head," one at the "feet," and one in the centre. But since the rectangle measures 205 paces, or about 130 metres in length, it is obvious that the "mother of mankind" is regarded as having been of gigantic dimensions. The central stone is very large, quadrangular in shape, hollowed, and furnished with a drainage groove. It appears to be of crystalline rock—while the tomb itself stands on coral —and is apparently an ancient stone of sacrifice. The whole rectangle points to the polar star. It is thus probable that the "tomb," no less than the *kaaba* of Mecca, long antedates the rise of Islam, and that both Jedda and Mecca were places of pilgrimage long before Mahomet. Taking this supposition as a starting-point, M. Gautier works out, in a very suggestive fashion, the thesis that this part of the coast of Arabia has been inhabited for two thousand years by a regional grouping—not a race—whose whole life is based upon the sea and sea-borne trade. It is not a question of race, for the locality is so unhealthy that no people can continue to exist without a continual influx of new blood; but throughout all the changes the peculiar mode of life has persisted, and this regional grouping, for the author, is to be regarded as representing the same type as that which in the Mediterranean existed for a time as the Phœnician people.

He lays great stress upon the peculiar detachment of the people of Jedda from the land in which their city is placed, and the entire unsuitability of the site for the construction of a town. Both Yambo and Jedda are placed upon an elevated coral reef, in a region which is virtually desert. In the general case it is justifiable to assume that a desert city will be placed on an oasis. But Jedda and Yambo are not only cities without gardens, but have not even a plot of vegetables either within or without the walls. The desert reigns unrelieved. At Jedda there are one or two wells, but their water is brackish and contaminated, and their supply bears no relation to the needs of the town. Nor are there aqueducts bringing water from a distance. The inhabitants depend upon the supply obtained in rainwater cisterns, which are always private property, and are a source of revenue to their owners. The only local food supplies consist of the fish of the coral reefs, a few sheep brought by the Bedouins, and dates. All other food supplies are imported from a distance. Further, though the houses are furnished with elaborate wooden balconies, verandas, built-out windows, and so

forth, the region produces no wood, which has all to be imported. The people now live, of course, chiefly upon the pilgrims, great numbers of whom die in the Holy Places, while all are more or less despoiled of their worldly goods during their visit.

In the early part of the nineteenth century, however, as is shown by Burckhardt's descriptions, the pilgrims were not the only—perhaps not even the chief—source of revenue. Then Jedda depended chiefly upon its position as an *entrepôt* in the trade between the Indies and the Mediterranean, for the sailing ships coming from India stopped here. When steamships replaced the old small boats and this *entrepôt* trade was lost, a new source of revenue was found in the increasing numbers of pilgrims.

M. Gautier emphasises the resemblances in architecture, types of boats, and so forth between Jedda and the ports of Madagascar, and gives it as his opinion that the Holy Cities have far greater affinities with the settlements of the Indian Ocean than with the Moslem world properly so-called. He believes that before Islam arose there lived round the Red Sea and on the coasts of Arabia peoples, such as the ancient Himyarites, who were comparable to the inhabitants of the Hedjaz to-day, and whose mission was to act as intermediaries between the Mediterranean world and India. Such peoples, far less modified by the rise of Islam than is usually believed, are the direct origin, in the author's opinion, of the present inhabitants of the Hedjaz.

Africa.

The Mountain Club of South Africa.—The *Annual* of this Club has been added to our list of exchanges, and there are now available in the Library a number of back issues. The articles deal not only with mountain climbing in the limited sense, but also with many aspects of South African geography and scenery, while the numerous illustrations are also in many cases of much geographical value. In addition, there are papers of a general scientific character, the constitution of the Club enjoining upon its members a wide interest in science, especially in climatology, meteorology, geology, and biology, an interest which is reflected in the nature of their publication.

America.

The Flora of the Region round Philadelphia.—The city of Philadelphia is given in most text-books as an example of a fall-line city, for it is placed where the foot-hills drop to the coastal plain. The economic importance of the site has often been emphasised, but a note in the May issue of the *Geographical Review* raises a new point of interest in connection with the position. The note is based upon a paper by Professor Spencer Trotter, with the title of "The Life Features of the Coastal Plain and Piedmont." In this the author shows that the uplands just north and west of the city possess a flora and fauna of the type described as transitional between the Boreal and Austral types, while

the lowlands immediately south-east contain plants and animals distinctly southern in character, though occurring far to the north of the natural home of this flora and fauna.

The animals seem to occur simply because they find in the two zones the type of vegetation to which they are accustomed, so that it is the presence of the two different floras which requires explanation. The author believes that the contrast is not due so much to present differences in climate or altitude as to past geological conditions. The transitional hardwood forest of the uplands is a remanent of the warm temperate flora of Miocene times, which once spread far to the north. Its present distribution is the result of alternating periods of warm and cold climate. During the cold periods the forest trees and their associates were only able to survive along the margin of the plateau, that is, at the fall-line. But the coastal plain is due to gradual uplift of a previously submerged seaboard, and as the sands and clays rose above the water they were colonised by incoming plants of southern type, which found here congenial soil.

Economic Geography.

Tin in Virginia.—It is well known that the United States are almost entirely dependent on foreign sources for their supplies of the important metal tin. Under the stimulus of war conditions energetic search is now being made in the hope of finding domestic sources of supply. One of the most promising deposits yet investigated is in the Irish Creek district, in the eastern part of Rockbridge County, Virginia, near the summit of the Blue Ridge. The deposit here has long been known, and was worked between 1883 and 1893, when the mines were abandoned. The cassiterite occurs in quartz veins in a peculiar granitic rock, but the veins are interrupted, and their content of tin appears to be irregular. Some high-grade ore has been found, however, and some tungsten ore occurs with the cassiterite.

French Ports and the War.—Before the war the superiority of ocean transport over land transport was an economic commonplace, though even then some geographers suggested that the development of marine communications, which was the great feature of the latter part of the nineteenth century, might prove to be a temporary phenomenon, and that land routes might tend some day to re-acquire their former importance. The submarine campaign and its consequences have, during the war, produced some very curious modifications in lines of communication, and it is at least possible that the world shortage of marine tonnage may, even when peace comes, delay the re-establishment of the old conditions. Among the interesting changes due to the war has been the new importance of some of the French ports which had previously been decaying. For example, before the war Italy, as is well known, was largely dependent upon English coal, carried through the Straits of Gibraltar by sea to the Italian ports. The risks of sea traffic off the western coast of Spain and in the Mediterranean have led to a new

development of the Biscayan ports of France, which receive the coal, and transmit it overland to Italy. Much of this traffic comes to Bordeaux, but, owing to its amount, a new port has been made at the old harbour of Blaye, on the right shore of the estuary (see *La Nature*, Jan. 12, 1918, and the *Geographical Review*, May 1918). All the transport equipment here has been supplied by Italy, the workers are prisoners or Italians, and the Italian language is spoken to such an extent as to convert the port practically into an Italian town.

Another decaying French port which has received a new stimulus from war conditions is Cette, which has become the port of Switzerland. Cette has had a somewhat chequered history. Its great period of prosperity was from 1861 to 1891, when it was the outlet for the wines, brandy, and salt of Languedoc, and had an active trade with Spain and Italy. To the latter country it exported a considerable amount of coal from the coalfields of Gard. The lapse of the commercial treaties with Spain and Italy in 1891, the phylloxera crisis, the development of a direct trade between Algiers and the Channel ports of France, and, in the case of coal, the competition with the English product, all affected Cette injuriously. At present, owing to the risks of sea transport, the direct trade between Cette and Algiers, on the one hand, and Spain on the other, has increased enormously, while at the same time imports for Switzerland are pouring into the port. The congestion is therefore extreme. Swiss journals have expressed great surprise at finding the port so badly equipped, but as M. Leopold Vivarès, the author of an article in the *Bulletin* of the Société Languedocienne de Géographie, from which the above facts are taken, points out, they fail to realise the sudden and enormous increase in the trade of a port which had previously been steadily decaying.

Wheat-production in European Russia.—A short article in the *Annales de Géographie* for May 15 gives some interesting facts as regards the production of wheat in the Russia of pre-war days, and the trade, external and internal, in the product. Cereals are very largely cultivated in Russia, for it is stated that no less than 90·4 per cent. of the arable lands are under grain crops. On the other hand, the yield is not large. Before the war rye still predominated, but wheat was steadily gaining ground, the figures being, for 1913, 29 million hectares (about 72 million acres) under rye as against 25 million hectares (about 62 million acres) under wheat. As is well known, wheat is only grown on the large scale in the Black Earth zone; this area produced, in 1913, 75 per cent. of the total crop. In total production Russia stands second after the United States, the figures for the five-year period, 1910-14, being 261 million hectolitres (about 714 million bushels) for the United States as against 230 million hectolitres (about 633 million bushels) for European Russia. Methods of cultivation, especially so far as the small farmers are concerned, leave much to be desired, ploughing being shallow, and a long period of uninterrupted cropping, without manure, being followed by a longer period of fallowing. The wheat is mostly spring wheat, owing to the severity of the winter, and the scanty snow cover.

The limited area in which wheat is cultivated in relation to the country as a whole, and the fact that in the towns the use of wheaten bread is steadily increasing, though the peasants everywhere eat rye bread, means that less wheat is available for export than is generally believed. In the period between 1906 and 1914 the amount exported varied from a minimum of 12·8 per cent. to a maximum of 33·1 per cent. of the total production. It is chiefly the southern part of the Black Earth zone, especially the southern parts of the governments of Voronezh, Poltava, and Kiev, and the region to the north of the Caucasus, which export wheat overseas. The more northerly parts of the zone supply chiefly the regions, especially the towns, in the north and west of Russia, where there is a natural deficiency of wheat. Before the construction of railways internal commerce in wheat was chiefly carried on by means of the Volga, such river ports as Tsaritsin, Samara, and Simbirsk being important centres of the trade. Traffic is, however, extremely slow, and it takes from two and a half to four months for the grain to reach Rybinsk. When it arrives too late in the season to be carried by the canal system to Petrograd and Reval it has to be stored till the spring melting of the ice. Though grain, up till the war, occupied after wood the most important place among commodities conveyed by water, the tendency to use the railways for its transport was becoming more marked. Even here, however, the difficulties were numerous, owing to bad organisation, want of honesty among the middlemen, and the absence of *entrepôts* and elevators. These difficulties naturally raise prices, sometimes to an excessive extent, as one passes into the interior. It is stated that before the war the State Bank had undertaken to construct eighty-four elevators in the interior governments of the south-east, but only thirteen of these were ready at the outbreak.

As to the conditions since the beginning of the war, little can be said. It seems clear, however, that in the early stages the difficulties of transport led to an accumulation of stocks in the areas of production, with a consequent drop in price. In these regions, therefore, the animals were fed with the surplus cereals. As the war went on, stocks everywhere diminished and prices rose, suggesting diminished production. Since the Bolshevik revolution, and the seizing of the lands by the peasants, it seems certain that production has very notably decreased. The reasons are various. In the first place, it was the large proprietors who had adopted advanced methods ; the peasants who have taken their lands are far less skilful. Again, the peasants are by no means certain that they will be permitted to keep the lands seized, and there is thus no motive for working them systematically. Finally, agricultural machinery is no longer being made in Russia, and imports have ceased. In 1917 the yield per hectare was everywhere below the average, and the harvest bad : there is no evidence that that of 1918 will be any better. It would seem, therefore, as if the Bolsheviks had been nearly as successful in ruining agriculture in Russia as they have been in destroying industry within the country.

In order to emphasise the interest of the Russian wheat problem, we may, perhaps, add that the wheat-producing zone lies largely, but not

exclusively, within the limits of the independent Ukraine; it extends obliquely across the country from the Ukraine to the vicinity of Kazan. Further, if the difficulties of transport were considerable before the war, these are certainly much greater now, owing to the condition of the railways, the general disorganisation, and the depreciation of rolling stock. Two great problems thus present themselves—the immediate question as to how far the Central Powers can obtain cereals from the Black Earth zone, and the more distant one as to the possibility, after the war, of re-establishing Russia as a wheat-exporting country. At present it would seem as if Russian production must be greatly diminished for many years to come.

NEW BOOKS.

EUROPE.

The Eclipse of Russia. By E. J. Dillon. London: J. M. Dent and Sons, 1918. *Price* 16*s. net.*

In an autobiographical note the author of this important work thus relates his qualifications for writing it: "By way of preparation I had studied Slav languages at the University of Innsbruck, and afterwards under Leskien at the University of Leipzig, and the first period of my sojourn in Russia was spent on the Steppes of the Ukraine, where I acquired the language of the province. Since then I lived and worked for years in close contact with the Liberal movement under three Tsars, and in various capacities, as a student, as a graduate of two Russian Faculties and Universities, as Professor of Comparative Philology at the University of Kharkoff, as the author of several literary and scientific works, as leader-writer of two Russian newspapers and editor of one, as representative of the *Daily Telegraph*, and adviser to my eminent friend Count Witte," the celebrated Minister under the last Tsar. With all this long and varied experience it is not surprising that he has produced a most valuable personal study and record of Russia, a country which Dr. Dillon declares is "a cryptic volume to Slav nations, and to Britons a book with Seven Seals. Between Slav and Saxon in particular there yawns a psychological abyss wide enough in places to sunder two different species of beings, not merely two separate races. And of all Slav peoples, the Russian is by far the most complex and puzzling. . . . After ages of spiritual stagnation and politico-social bondage, the Russian man is still half a child and half an imperfectly tamed beast. In his dealings with his fellows, the Russian often runs through the entire gamut of temperament, from feminine gentleness to bestial ferocity." As an example of the latter, we may instance a scene which Dr. Dillon witnessed in Petrograd the day on which the Tsar Alexander II. was assassinated. Two University students laughed when they heard of the assassination, whereupon an indignant crowd seized them "first by the ears, which were pulled away," and then tore the students limb from limb!

"One of the most powerful engines," says Dr. Dillon, "for preparing, maturing, and consummating the politico-social cataclysm was the University, together with the numerous tagrag and bobtail of loosely-thinking, wildly-speaking humanity that centred around it. Endowed with marvellous receptivity, a hypercritical cast of mind, impatience to learn everything, combined with insuperable sloth and

infirmity of purpose, the Russian student was filled with awe for science, took for granted Western theories, principles, and ideas, and applied them as standards of comparison to the institutions and doctrines of his own country. These young men, most of whom never completed the high-school curriculum, were turned loose upon the country to sow seeds of discontent and rebellion whithersoever they went."

Regarding the famous "Intelligentsia," the author states that it "had no roots in the people. Its members were severed and sundered from it, but they resembled one of those preaching orders which were founded in the Middle Ages, whose energy and success largely depended on their complete detachment from every class and concrete interest. It was the Intelligentsia who sowed the revolutionary seed and watered it. They dwelt in abstractions, operated with Western theories, transplanted fragments of Hegel, Marx, Kautsky, Mill, Buckle, to Russian soil, and pushed each proposition to the Ultima Thule of its consequences. Although they belonged to different schools of thought, they united for purposes of destruction."

As for the Russian Church, "it was a mere museum of liturgical antiquities. No life-giving spirit ever animated that rigid body, for Bysance was powerless to give what it did not possess. The clergy, with the exception of a few self-mortifying anchorites and ascetics, were a body of social parasites, poor, squalid, grasping, and ignorant."

"It was to free the people from the mighty bureaucratic vampire that the Revolution was conceived by the intellectuals. The fundamental error committed by its promoters was that they treated the masses as Ivan the Terrible had treated his *opritchniki*, and offered them a share in the booty—the land—whereupon the people contented itself with reversing the existing system, or rather democratising it, and took to preying on the classes that possessed land, fortune, culture." Again, bureaucratic "coercion in religious matters did more to spread political disaffection than the most enterprising revolutionary propagandists. It turned the best spirits of the nation against the tripartite system of God, Tsar, and Fatherland, and convinced even average people, not only that there was no lifegiving principle in the State, but that no faculty of the individual or the nation had room for unimpeded growth. Whithersoever one turned, progress was barred by artificial obstacles."

In his estimate of the last Tsar, Dr. Dillon remarks, "While it would be a gross exaggeration to saddle Nicholas II. with the sole responsibility for the dissolution of the régime and the ruin of Russia, it is fair to say that no man contributed so materially to bring them about as this shallow, weak-willed, shifty creature. It was impossible to trust him either to redeem his word, to stand by the Minister who acted it, or even to refrain from intriguing against his own responsible agents for the purpose of undoing the work which he and they had undertaken and achieved conjointly." Dr. Dillon describes the members of the Tsar's *entourage* who combined to drag him to his doom. Both his mother and his wife gave him bad advice, and hastened the fall of the dynasty. As for the notorious Rasputin, "nearly all Russia applauded the heroic deed which sent the drunken, obscene satyr to his last account."

From his intimate knowledge of Russia, Dr. Dillon knew that the downfall of Tsardom was imminent. The peasantry no longer worshipped the Tsar. "All that they wanted was land,—how it was obtained being a matter of no moment to them. Their view of property was that their own possessions were inviolable, whereas those of the actual owners should be wrested from them without more ado." The Intelligentsia, composed chiefly of theory-mongers who carried on a

continuous anti-monarchist and communistic or nihilist propaganda in schools and elsewhere, was perhaps the most corrosive solvent of all. "That the autocracy was doomed, and would not survive Nicholas II.," Dr. Dillon felt was certain as far back as May 1905, when great rioting occurred in Petrograd, and when the first "Council of Workmen and Soldiers" was formed by the Revolutionaries.

As for the Bolshevism of the Revolution of 1917, Dr. Dillon observes, "In the Bolshevik movement there is not the vestige of a constructive or social idea. Even the Western admirers of Lenin and Trotzky cannot discover any. Genuine Socialism means the organic ordering of the social whole, and of this in the Bolshevik process there is no trace. For Bolshevism is Tsarism upside down. To capitalists it metes out treatment as bad as that which the Tsars dealt to serfs. It suppresses newspapers, forbids liberty of the press, arrests or banishes the elected of the nation, and connives at or encourages crimes of diabolical ferocity." The danger which Dr. Dillon predicted in 1905 has come true, and Russia is the victim of internal disruption and German domination. Yet he does not altogether despair of the future of Russia: "Ages of ignorance and serfdom may have suspended, but have not wholly crushed, the freedom of spirit, the fellow-feeling for suffering, and the embryonic humanities characteristic of the race. These qualities, freed from the many and noxious weeds with which they are still entangled, may yet make of Russia a potent social force, capable of being directed to a high ethical purpose."

A Handbook of Northern France. By William Morris Davis, S.D., Ph.D., Professor of Geology Emeritus, Harvard University: Cambridge, Harvard University Press, 1918. *Price* $1.00.

This little handbook was written by Professor Davis for the use of officers of the U.S.A. Army in order that they might have an intelligent grasp of the physical features of the country in which they were to operate. But though intended for officers it is equally valuable to all interested in the Western front, and a careful study of it will enable a reader to visualise the scene of operations, and the vague "somewhere in France" will become more definite and intelligible after the perusal of this book than it might otherwise be. We see here with startling clearness how operations of war are determined by the physical characteristics of the country, and how success or failure may be decided by the presence or absence of particular geological strata with the consequent effect on the surface features. A special merit of the book is its large number of excellent diagrams and sketch-maps, but their necessarily small scale will induce the reader to supplement his information by the study of large-scale maps. The book is by no means easy reading, and its study may cause many an officer and general reader to realise that something has been sadly lacking in their early geographical training.

The Story of the Paris Churches. By Jetta S. Wolff. London: Cecil Palmer and Hayward, 1918. *Price 7s. 6d. net.*

This book, which is illustrated from photographs, gives a general account, without architectural detail, of a great number of the Paris Churches. It is, apparently, intended especially for those visiting Paris under war conditions, for to the sightseer at present, as the author points out in her preface, the churches are more important than in times of peace, inasmuch as a great number of other public buildings are closed to the visitor. The chief historical events connected with the more important churches are described, and the book should be useful to war time visitors, especially those from overseas.

AMERICA.

L'Allemagne et l'Amérique Latine. Par Émile R. Wagner. Paris: Felix Alcan, 1918. *Price* 3 *fr.* 50 *c.*

In his Preface to this interesting book M. Edmond Perrier, Director of the Natural History Museum, Paris, informs us that the author, M. Wagner, had resided in Argentina for many years, and that his father was long a Minister Plenipotentiary in South America. Fifteen years ago the author undertook a voyage of exploration in the Brazilian provinces of Parana and Santa Catharina, where German "peaceful penetration" had proved most successful. In the present volume he describes this penetration as it occurred, before the war, in Brazil, Argentina, Uruguay, and Paraguay, and shows how Germans occupied some of the richest, healthiest, and most temperate districts throughout South America. He was immensely assisted in his researches on this subject by conversations he had with a German official of great influence in one of the most flourishing German colonies in Brazil. Of Swiss origin, the author is enthusiastically French and devoted to the Latin race. He recognises the thoroughness of the German penetration, but points out that it is purely for commercial and political objects, and does no good to the natives whom the Germans characteristically regard as only creatures to be exploited. The Germans even stirred up strife among the South American States in order to benefit by the natives being engaged in civil war. As his German companion frankly admitted to him, "What we have to do here is to win the fight, no matter how we do it," adding, "It won't be left always to the British, these proud and domineering people, to cover continents with railways and oceans with their ships. *We* also shall have one day an Empire on which the sun will never set!" The author describes another German he met who was a military spy, and who, during an expedition to the interior of Parana, made most minute strategical notes of the country to be forwarded to the authorities in Berlin.

The Germans have long entertained fantastically ambitious designs upon South America. Their well-known writer, R. O. Tannenberg, constructed a map (given in this volume) showing that the portion of the Continent destined to fall under German sway comprised the southern halves of Brazil and Bolivia, and all Chile, Paraguay, Uruguay, and Argentina. Herr Tannenberg is even kind enough to inform the inhabitants of these benighted countries how greatly they are to benefit by German domination. "First of all," said he, "Southern Brazil, Paraguay, and Uruguay must acquire German *Kultur*, and the national language there must be German. We may allow Chile and Argentina to retain their language, but we must insist that German shall be the second language taught in schools." It is not surprising that the countries thus marked out for Germany's new empire in South America were indignant at such insolent proposals and alarmed at the increasing German colonisation, and that they were found unanimously arrayed against Germany during the present war.

GENERAL.

On the Fringe of the Great Fight. By Colonel George G. Nasmith, C.M.G. Toronto: M'Clelland, Goodchild and Stewart, 1918. *Price* $1.50.

Colonel Nasmith accompanied the First Canadian Contingent to Europe as Sanitary Adviser and Director of Water Supplies. He gives a graphic account of the voyage to Plymouth and the experiences of camp life on Salisbury Plain during the terribly wet autumn and winter of 1914, and recounts his impressions

of London life during the early days of the war. He was present when the Germans launched the first gas attack at the second battle of Ypres, on April 22, 1915, and the Canadians so gallantly filled the gap in the line caused by this new and unexpected weapon of offence. In the later chapters he describes the medical organisation of the army in the field; the methods adopted in "keeping the British soldier fit," and the work carried on by the Field Laboratory staff; and tells us how "advances made in our knowledge of how diseases are spread and controlled have made it possible to keep communicable diseases in absolute subjection." Typhoid is now practically a negligible quantity in the British army of nearly five million men in France and England.

The use of chlorine for the sterilization of drinking-water in the field, by methods first devised by the author in 1909, is general throughout the army. The means adopted for combating the plague of lice, the carriers of typhus—as yet unknown among the troops in France—and devices for killing the rats that swarm in the trenches, are thorough and ingenious. "It is a common thing to see a soldier sitting patiently in the trenches with his rifle between his knees and a piece of toasted cheese on the end of his bayonet; as Mr. Rat, attracted by the savoury odour, approaches and takes the first sniff, the trigger is pulled, and there is one living rat less. Prizes are given to the men who kill the largest number in a week."

In March 1916 Colonel Nasmith was appointed to represent Canada on the War Allies' Sanitary Commission in Paris, of which city under war conditions he gives us a lively picture. A chapter entitled "Table-talk at a Flanders Mess" reports the views—interesting in the light of later events—of the Canadian officers on the attitude of Canada and the United States towards the war; and this most readable and informative volume closes with the experience of the author on the Belgian border in 1916, in country now, alas! once more in the hands of the enemy.

In France and Flanders with the Fighting Men. By Lauchlan Maclean Watt, Chaplain to the Forces. London: Hodder and Stoughton, 1917. *Price 3s. 6d.*

Mr. Maclean Watt possesses the poetic spirit as well as other rare gifts of mind and heart. His descriptions of military life on the battlefield do not bear so much upon the movements of the campaign as upon the grim sufferings and sacrifices of war. Mr. Watt was mainly associated with the Gordons and the Black Watch, and the hard fighting these dauntless regiments went through both tried and fired his quickly responsive soul. His heart leaps to the Highland music, and under its touching strains his feet can scarcely keep still. The men found in him a Celt of the warmest temperament, and he repays them by chronicling their deeds in sympathetic and glowing language. He carries his readers, not to the Hospital merely, but up the Line, and into the Trenches, with "Bullet and Shell," amid "Laughter and Tears," and makes war live before them in its horrors, in its daring, and in its patiently and courageously borne agony. It is *War* Mr. Watt describes, lighting up its lurid darkness with many a story of the Scottish soldier, whose rich humour fails him not in the hardest circumstances. Vivid, touching, bracing are his pages. He finely says: "The British Army beats with the pulse of the noblest of our flesh and blood. It is not the gathering of a mass of professional fighters; it is the assembling of true men dedicated to win or die for the sake of the honour of God, the liberty of the world, and the growth of the soul of goodness."

The Victim's Return. By Noëlle Roger. With an Historical Note by Eugène Pittard. London: Constable and Co., 1917. *Price* 2*s.* 6*d. net.*

This is a most pathetic little book, giving accounts of the work done in Switzerland in connection with the repatriation of interned and evacuated civilians during the earlier part of the war. The Historical Note gives facts, especially statistics, of much permanent value, while the rest of the book is descriptive in nature. Its accounts of the infinite tragedies enacted in the French occupied territories are heartrending; but the sympathy, compassion, and practical help bestowed by the Swiss, both in the French and German cantons, form a relieving note.

My Life as a Naturalist. By W. Percival Westell, F.L.S. With an Introduction by the Earl of Lytton. London: Cecil Palmer and Hayward, 1918. *Price* 7*s.* 6*d net.*

This book, which has a photograph of the author, and a number of illustrations from drawings, consists of a series of chapters dealing chiefly, though not exclusively, with subjects connected with nature study. We gather that some of these chapters have appeared elsewhere as articles. Among those of geographical interest may be mentioned one entitled "Highland Memories," and another called "Along the Coast and Elsewhere." The first gives a somewhat imaginative description of a journey from Glasgow to Mallaig, in the course of which the author states that he is "informed that the depth of Loch Treig has never yet been ascertained," and that when he passed "not a bird was tempted to fly over its mazy depths." The maximum depth of Loch Treig was shown by the Bathymetrical Survey to be 436 feet, which is of course very much less than that of Loch Morar. There are some other statements which suggest that the author's preparation for his task of writing has not been very profound, even when the subjects chosen are not recondite—there is an odd reference to the "Cornflower Works" at Paisley, on p. 186. We fear the book, in so far as it is geographical, will appeal chiefly to the uncritical, but the sections dealing with nature study show much enthusiasm for the subject.

BOOKS RECEIVED.

Modern Whaling and Bear Hunting. By W. G. Burn Murdoch, F.R.S.G.S., F.S.A.Scot.. With 110 Illustrations. Small royal 8vo. Pp. 320. London: Seeley, Service and Co., 1917. *Price* 21*s. net.*

Boundaries in Europe and the Near East. By Col. Sir Thomas H. Holdich, K.C.M.G., K.C.I.E., C.B., D.Sc. With 4 Maps. Demy 8vo. Pp. xii + 224. London: Macmillan and Co., Ltd., 1918. *Price* 8*s.* 6*d. net.*

Map Work. By V. Seymour Bryant and T. H. Hughes. With 91 Illustrations. Small royal 8vo. Pp. 174. Oxford: at the Clarendon Press, 1918. *Price* 5*s. net.*

The Statesman's Year Book, 1918. Edited by Sir John Scott Keltie, LL.D. London: Macmillan and Co., Ltd. *Price* 18*s. net.* Presented by the Author.

Civil Wars of Peru. By Pedro de Cieza de Léon. (Part iv., Book ii.): *The War of Chupas.* Translated and edited, with Notes and Introduction, by Sir Clements R. Markham, K.C.B., F.R.S., D.Sc. Demy 8vo. Pp. xlvii + 375 + xxxix. London: The Hakluyt Society, 1918.

The Soul of Denmark. By Shaw Desmond. Demy 8vo. Pp. 277. London: T. Fisher Unwin, Ltd., 1918. *Price* 10*s.* 6*d. net.*

The Making of Modern Yorkshire. 1750-1914. By J. S. Fletcher. Demy 8vo. Pp. 328. London: Allen and Unwin, Ltd., 1918. *Price 7s. 6d. net.*

Transactions and Proceedings of the New Zealand Institute for the Year 1916. Vol. xlix. Wellington, New Zealand.

The Fauna of the Clyde Sea Area. Being an attempt to record the Zoological Results obtained by the late Sir John Murray and his Assistants on board the S.Y. *Medusa* during the years 1884 to 1892. By James Chumley, F.R.S.G.S. Glasgow: at the University Press, 1918. Presented by the Author.

Report on the Administration of Bihar and Orissa during 1916-17. Patna, 1918. *Price 7s. 6d.*

Publishers forwarding books for review will greatly oblige by marking the price *in clear figures, especially in the case of foreign books.*

NEW MAPS.

EUROPE.

ORDNANCE SURVEY OF SCOTLAND.—Publications issued from 1st January to 31st March 1918:—

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* Revised on new meridian, the plan numerals therefore differ from those of the previous Revision.

Note.—There are no coloured editions of these sheets, and the unrevised impressions have been withdrawn from sale.

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„ coloured copies of such as are in stock, 1s. 6d. more than prices hitherto quoted in catalogues.

ADMIRALTY CHARTS, SCOTLAND.

Cromarty Firth. New edition, 1918. No. 2167. Price 3s.
Cromarty Firth Anchorage. New edition, 1918. No. 3110. Price 4s
Sound of Islay. New edition, 1918. No. 2481. Price 3s.
Mull of Cantyre to Ardnamurchan. New edition, 1918. No. 2515. Price 4s.
Admiralty Office, London.

BARTHOLOMEW'S HALF-INCH TO MILE MAP OF SCOTLAND.

Sheet 28. Orkney Islands. Orographical colouring and Roads. New edition, 1918. Price 2s. 6d. net, mounted on cloth.
John Bartholomew and Co., Edinburgh.

WAR MAPS.

La Fronte Italiana tra Brenta e Piave. Scala 1 : 100,000. (2 sheets.)
Carso Triestino, Goriziano.—Carta del Grande Altopiano della Carsia Giulia. Scala 1 : 100,000. 1918. Prezzo L. 2.50.
Scacchiere Franco-Anglo-Belga-Tedesco. Scala 1 : 1,000,000. Prezzo L. 1.50.
Teatro della Guerra in Asia. Scala 1 : 15,000,000. Prezzo L. 3.
Istituto Geografico di Agostini, Novara.

AMERICA.

ONTARIO AND QUEBEC.—Map showing Branches of Chartered Banks. Scale 25 miles to an inch. Third edition. 1917.
Department of the Interior, Ottawa.

QUEBEC.—Standard Topographical Map. Scale 1 : 250,000, or about 4 miles to an inch. Montreal Sheet, 11 s.w. J. E. Chalifour, Chief Geographer. 1918.
Department of the Interior, Ottawa.

PERU.

Mapa Popular. Escala 1 : 3,000,000. Trazado por la Sociedad Geografica de Lima, 1913.
Mapa del Departamento de Loreto. Escala 1 : 1,000,000.
Mapa del rio Putumayo. Escala 1 : 500,000.
Mapa del rio Napo. Escala 1 : 500,000.
Mapa del rio Ucayali. Escala 1 : 500,000.
Mapa del Alto Yurua y Alto Purus. Escala 1 : 1,000,000.
Dibujado por Camilo Vallejos Z., Cartografo de la Sociedad.
Presented by the Geographical Society of Lima.

The Geographical Society of Lima renders valuable service in the periodical publication of these maps, showing recent surveys and explorations.

GENERAL.

ADMIRALTY CHARTS—MAGNETIC VARIATION.—Charts showing Curves of Equal Magnetic Variation, 1917.
Sheet 1. Atlantic Ocean. No. 3775. Price 5s.
„ **2. Indian and Western Pacific Oceans.** No. 3776. Price 5s.
„ **3. Eastern Pacific Ocean.** No. 3777. Price 5s.
Admiralty Office, London.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

GEOGRAPHICAL TEACHING METHODS: CRITICISMS AND SUGGESTIONS.[1]

By Wallace E. Whitehouse, M.Sc., L.C.P., Cambridge Geography Diploma, late Gilchrist Geog. Student.

Methods of study in Geography must be discussed with reference to the grade of work intended, *i.e.* either school or college, the former including both elementary and secondary school pupils. The secondary school division will consist of a considerable number whose official classroom education ends there, and a few working in preparation for further study in University or Training Colleges. This gives four groups: Primary, Secondary, Secondary Continuation, and College. Group 4 is usually Group 3 working in new surroundings, but the two are distinguished so as to emphasise the need for different treatment of the work in the two institutions.

Different Methods for Different Groups.—Several otherwise excellent schemes have not kept the grades sufficiently distinct, nor has sufficient distinction been drawn between the requirements of the different sexes, particularly in some of the grades; for example, geometrical surveying is a play-game in certain boys' schools having well managed Scout troops, whereas it is difficult, unattractive work to many girls, who in turn would delight in other forms of survey, such as of local customs, folklore, games, and industries. Still another aspect of the necessity for differences of treatment of the work is illustrated by some analyses of ages and successes in an examination taken annually by nearly four thousand pupils. Mr. Fairgrieve calculated that ninety per cent. of the sixteen-year-old boy candidates passed in geography at the matriculation stage, and

[1] Based on a paper read at a meeting of the Geographical Association, London, 5th January 1918.

a high percentage of the seventeen-year-old girls at that stage. These were optimum ages. My conclusions agreed with these, both then and subsequently, also an independent investigation suggested that fourteen and fifteen years were the optimum ages for the pre-matriculation examination of the same Board, but for neither examination was the percentage of the girls' successes equal to that of the boys' successes. This may be due (partly) to the character of the examination papers themselves, but another investigation showed me that in schools where boys and girls were taught separately at the matriculation stage then the percentages of passes at the optimum ages were not very dissimilar, but in mixed schools with candidates for the same examination the comparative percentages of successes (all ages) were 81 and 56 respectively [1]—allowing for the fact that mixed schools may be smaller and so possess less opportunities, there is evidently something else to be considered. Another incomplete line of investigation deals with percentage successes obtained when the mixed classes are taught by women substituted for men called up for other work; no great change in *comparative* percentages has yet been noted, but it is too early to make definite statements.

In any case it seems established that even in the same grade differences of treatment may become necessary; even more so must there be differences of treatment in the different grades. A recent stimulating article by Sir Napier Shaw [2] emphasises the necessity for different methods of teaching meteorology in schools from those employed in colleges. His conclusions for meteorology hold good for geography. This article deals chiefly with school geography.

College Work and School Methods.—The work of the College is to sort out, classify, and link up geographical data—to make new discoveries in connection with such data, and particularly to test and to accept or reject geographical generalisations. It sometimes happens that a few of our research students will be forced to travel very slowly through being overburdened with material collected during their travelling—material which is not so much new in character as unrecognised in type by the collector. It therefore becomes necessary that instruction and education preliminary to the college stage should aim at being definite in character, and students should have a *sound* foundation on which to build.

Are all teachers satisfied with the earlier knowledge possessed by their pupils? Is there not a tendency for the college to blame the secondary school, and for the secondary school to pass on the condemnation to an earlier grade? Much of such criticism is justified, and some of it arises through confusing the grades. To attempt college work in the secondary schools may result in the neglect of legitimate secondary school work or in efforts to simplify work that in its essence must be complex—in either direction disaster lies. Apart from this,

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[1] These figures are based on the totals for three consecutive years, and each year differed but slightly from the total result. The conclusions relate only to the geography papers.

[2] *Quarterly Journal Royal Meteorological Society*, January 1917, p. 83.

are we all satisfied with the progress made in geography, for each particular grade, during recent years? Of course, there *has* been progress, few subjects can show as much; equally, few subjects had so many opportunities and so much leeway to recover, but has the progress been well balanced? Little comment can be made with regard to progress of teaching methods in the University Colleges of Britain, for geography is insufficiently established yet. In some centres the higher possibilities are realised, but on the whole the standard compares somewhat unfavourably with, say, that of the great geography schools of France.

Positional Geography and Place-Names.—In the schools there is more experience on which to base conclusions, and frankly here one notices matter for recent criticism, particularly in connection with map study.

A useful form of stocktaking would be to analyse the contents of the periodical commenced by a great geography teacher—Dr. Herbertson—for geography teachers, and see in which directions interests have moved. The Introduction to Part I. of the *Geographical Teacher* was published in 1901, and two paragraphs by Mr. Douglas Freshfield are of special interest.

"Par. 5. Our object is to enforce the place and importance of geography, *not only as a body of facts and proper names*,[1] but as an educational discipline and an element of general culture."

"Par. 7. It is of national importance that the crass ignorance of cartographical methods in which most Englishmen are brought up should be done away with. The average educated man in this country cannot readily understand the symbols of cartography, or in plain English 'read a map' [or in plainer English 'spell a map.'"—W. E. W.].

The modern reading of par. 5 frequently omits the word "only," and so reads "not as a body of facts and proper names." The catch phrase "lists of capes and bays" is frequently used as an excuse for gross ignorance regarding the positions of important places. The old methods will, fortunately, never be accepted again, but modern methods are arousing a certain amount of criticism too—and this by thinking people friendly to our cause. Examiners complain of this growing tendency to omit place-names, frequently from ignorance, sometimes through mental laziness, and occasionally so as to render the work "modern." A personal experience may be used to illustrate the point: a script of matriculation stage was recently marked in which the pupil, apart from those in the question heading, used but two place-names in nearly three pages of written work, and then referred to the great traditions of Spain as illustrated by its capital Lisbon (*sic*). Business men also complain of ignorance of place positions, etc., exhibited by young assistants who claim successes in "modern geography" work. Several teachers deride this bread-and-butter aspect, but for many finishing their school career in Grade 1 it is an aspect to be considered. It is frequently remarked that one can always consult a gazetteer for this mere memory stuff—one can always consult a dictionary, yet it is advisable to know a few of the

[1] Italics not in original.

more commonly used words. The point should not be misunderstood; our geography for all grades must consist of more than place-names and place positions, but it *must* include some of these, and there seems to be an unfortunate tendency to restrict unduly the number learned.

Dangers in Generalisations.—The next point is even more serious, and one is treading on more dangerous ground, with a much greater risk of being misunderstood. Mr. Freshfield spoke of "not only as a body of facts but as an educational discipline." This question of educational discipline is a very broad one, and in Grades 1 and 2 work it is not, at times, as seriously considered as it should be. There is too much spoon-feeding of the pupils, and there is too much striving for statements that are sometimes more interesting than valuable; there is a great deal too much hasty generalisation accompanying the elementary work in the subject, and as various contributory studies take their turn in being fashionable correlatives, so the scope widens and the hasty generalisations are still further generalised. To mention only a few: there was the 1905 access of practical work, largely geometrical survey attempted with generalised instruments. There is no need to re-open the vexed question of the value of geometrical surveying to the geographical pupil, the pros and cons have been set out in detail elsewhere,[1] but whatever the teacher decides as to the work to be done by the pupil, it is essential that the specialist teacher himself should know something about the processes involved. Then came more or less practical climatology, with more generalisation and a big mass of matter to unteach when the higher stages were reached. Next—the order is not intended to be chronological—we had geomorphological concepts with conflicting theories, simplified for school use but retaining an awe-inspiring vocabulary. Then one or two other treatments were experimented with, and gained a certain measure of recognition; now we have a very great awakening of interest in the human side. Many will say "Surely this is geographical"; possibly so, and so were they all—all geographical, or capable of being made so. The danger is not in the subject but in the treatment. Geometry, climatology, geology, geomorphology are none of them geography; on the other hand, neither is ethnology, nor anthropology, nor archæology, though the second group may sound more human. All must, of necessity, contribute to the full development of our subject, but whereas in the more mathematical subjects the errors can generally be readily detected, this is not so in the case of the human-biological group. Human geography, for many reasons, is admirably suited for the making of sweeping suggestions, experiments in test of such suggestions are frequently difficult; suggestions made by our leading human geographers are often of fascinating interest though sometimes of little scientific value. The danger arises when these suggestions are circulated, the originator's tentative remarks become established truths, and on this foundation is built a many-storied edifice, tall enough to attract general attention, and until the whole thing topples over it is a very prominent landmark in some kinds of teaching.

[1] *Geog. Teacher*, Spring 1915.

There is a danger that our pupils may be tempted to follow Taine's magnificent style with his over-simplified, over-systematised analysis. An article in this *Magazine* for June and July 1913 deals with the "specific characteristics and complex character of the subject-matter of human geography." The writer of the greatest French work on human geography is translated as saying: "I do not hesitate to state definitely that every truth concerning the relations between natural surroundings and human activities can never be anything but approximate: to represent it as anything more exact than that is to falsify it, it is to become anti-scientific in the highest degree."

This second point also should not be misunderstood. There *is* a place for these approximations in our geography work, less so in schools perhaps than in colleges: for the making of them, and particularly the using of them, demands a certain maturity of mind and a wide knowledge of auxiliary material, and even then they remain approximations.

Maps, Map-spelling, and Map-reading.—More exact thinking on the part of Grade 1 and 2 pupils will follow an extended and more scientific use of maps. It now becomes necessary to deal with the expressions "maps are only a means to an end," "many material facts cannot be mapped," and "young children cannot understand maps." Like other generalised statements there is a considerable amount of truth in the remarks, but the danger is that the less experienced and the less interested teachers of geography may quote them in excuse for weak map work.

Of course "maps *are* only a means to an end," but they can be a strictly geographical means to a geographical end, a means capable of being utilised more frequently, and one is a little inclined to say that, for one grade of the work, a more desirable end in themselves than the one occasionally attained. Next, "many material facts cannot be mapped," therefore the corollary is that map work means an incomplete study of our subject: true again, but for some grades our study will be incomplete in any case. This does not mean that one is advocating completeness in map study and a neglect of everything else. It would be better to change the phrase to "many material facts are not at present mapped." Our highest grade might with advantage turn its attention to the production of new maps. In addition to more cleverly applied increased mechanical skill in map reproduction, there has been a distinct improvement during the last few years in map contents, and, as has been well remarked, "maps afford us the surest outward and visible sign of a very real growth in the *science* of geography."[1] Military and civic authorities, teachers and general public, have demanded better maps: geography has always attracted enthusiasts, and the enthusiasm of our geography publishers is a very important and very pleasing fact.[2] Expressed demands have been met, and will be met, but teachers must agree as to their requirements. With the growth of interest in certain studies, various Government maps and charts have been made accessible

[1] Sir Thomas Holdich, address to the Geographical Association, January 1917.

[2] Teachers should note the article by Mr. George Philip in *Geog. Journal*, Dec. 1917.

to the general public, often accompanied by text explanations and descriptions, as in the case of the Geological Survey Memoirs and the Meteorological Office Charts, for the latter of which Sir Napier Shaw's recent booklets, "The Weather Map" and "Meteorological Glossary," are new features—cheap and authoritative volumes, using as few technicalities as possible; in short, ideal classroom books. Apart from such official productions, there is the possibility of devising new schemes for indicating facts distributionally, as, for example, in the suggested culture maps,[1] and a very successful attempt at mapping complicated anthropometrical characters has been devised by Professor Fleure.[2]

The third remark was that "young children could not understand maps." Here one is less inclined to agree without serious qualification. A start might be made with the "picture map"[3] of the character of those published by several weeklies, and young people take a great interest in "map-spelling" from the picture. Then there should be practice in modelling, and with reference to this possibly more use might be made of both the cruder ones and also of the more accurate ones.[4] For a few purposes distributions shown on accurate relief models can make a more striking appeal than ordinary cartographical work. From the "picture map" progress might be made to large scale plans and surveys, possibly in the future *via* aeroplane photographs and accompanying maps. An extremely useful article in this connection was published in the American *Geographical Review* for November 1917; its photographic illustrations show excellently this half-way house between "picture map" and survey plan.

It is not intended to detail a list of suitable map-reading exercises. Just how many aspects can be treated must be determined by the individual teacher. For this article the term "map study" is a broad one, and is intended to include some study of the globe (for the understanding of elementary mathematical geography, including map projections—for the teacher at least), atlas map study, with a hope that our British atlases will approximate still more to the best foreign ones, and that we shall soon possess atlases carrying out those recommendations reported by the special committee in 1915 to the British Association. Ordnance map study, British and foreign, on decreasing scales, and some reference to Admiralty charts, not only on account of extra symbols to add to the beginner's map alphabet, but also because depths with some pupils are more easily realised than heights. There will also be practice in the preparation and study of simplified maps and diagrams. Most teachers agree that the atlas and text book are better when published separately, but the text book can, with considerable advantage, contain enlarged or simplified, or occasionally modified sketch maps to emphasise particular points, but here again one must repeat that generalisations are sometimes dangerous, and not

[1] Miss M. S. Elliott, *Geog. Teacher*, Spring 1916.

[2] Article by Drs. Fleure and James, *Jour. R. Anthrop. Institute*, 1916, pp. 35-153.

[3] Miss Winchester, *Geog. Teacher*, Summer 1916.

[4] Closing chapter, *Handbook of Relief Model of Wales*, W. E. Whitehouse, National Museum of Wales, Cardiff, 1915.

less so, but rather more so, when expressed cartographically ; for examples see certain diagrams illustrating war operations. In the case of many text books an improvement would follow the omission of some of the sketch maps used ; they are, in short, unsatisfactory models for the pupils to adopt.

Pupils' Attitudes towards Sketch Maps.—If pupils prepared more maps for themselves this alone would be a most effective check on some of the hasty generalisations, illogical argument, and loose thinking that is being so severely criticised in several directions. Even in many schools where geography appears to be conscientiously taught there is a hesitancy on the part of the pupil to employ sketch maps. I wondered why this was so, and decided to ask some of the pupils themselves. In the autumn of 1917 I sent round to twenty-nine teachers, with whom I had discussed various aspects of geography, a set of questions which I asked them to dictate to thirty pupils—ten from each of three different forms. Individual schools were not to be mentioned, and individual pupils were unknown (merely an indication of age and sex), and the pupils were encouraged to speak their minds freely. Accompanying the pupils' sheet of questions was a more elaborate one addressed to the teachers, so that their attitude towards maps could be taken in association with the pupils' answers. Twenty-eight returned batches of material of much personal and general interest, and I am deeply grateful to those of my fellow-teachers who assisted with the catechism. Replies came from English, Welsh, and Scottish secondary schools and training colleges. One question addressed to the pupils was, "Why do *you* so seldom use sketch maps to illustrate your geography answers?" If teachers were satisfied as to the number of sketch maps used, then the question was not to be asked. In all but four cases the question *was* asked. Naturally the replies exhibited considerable variety, numbering as they did more than eight hundred in all. In general, omissions appeared to be due to lack of certainty as to positions, lack of time, lack of power to sketch ; but a few answers seemed to suggest that sometimes we might gain by a little cross-examination of the teacher by the pupil.

A few pupils were satisfied that they did use sufficient sketch maps, and expressed themselves somewhat indignantly on the matter. Five interesting replies are given in the pupils' own words :—

"I do ; they gain marks, and introduce a little recreation into the examinations." (Girl, 17.)

"Lack of time, sometimes of knowledge, and they usually look absolutely different from what they are intended to be." (Girl, 16.)

"If we aren't told to do it, there is no sense in doing it." (Boy, 14.)

"I feel I cannot do them, and only put them in exams. because they might give me a few more marks." (Girl, 15.)

"If I write a great deal the examiner may take a fancy to my writing or style and have pity on me and give me a few marks, whereas if I draw a sketch map I should probably make the substance of it worse than the answer in writing, and the examiner would straightway refuse to look at it." (Boy, 15.)

Other questions gave equally quaint replies; *e.g.*:—

"Outside of the class-room maps are of no use, only as decorations of some kind." (Girl, 16.)

"Contours are the most difficult part of map work, and I cannot do them very well. They require much thought, and there is more in them than appears on the surface." (Girl, 17.)

Space requirements forbid the further quoting of results of what I found to be a very interesting experiment.

Increased Interest in Military Maps.—Boys especially are now taking a new interest in maps, as something really serious and important, in which their elders, too, are interested. Teachers are advised to think out methods of utilising this new interest, for not only is the human and other material at hand, but, for the time being, the topic will be discussed outside the class-room even more frequently than inside. Apart from scoutmaster work with boy-scout troops in pre-war days, I have had but little personal experience in developing military map study in the secondary school, but a few points regarding military map work with a University College Senior O.T.C., and with the officers of a Welsh Division,[1] may be of interest to teachers desirous of helping their pupils in this direction. There are several differences in the school-room and military class-room approaches to map study. There is, of course, the obvious one that for the latter the instructor must have some knowledge of the work of the several arms of the service and their space requirements, and some knowledge of elementary tactics. Strategy, elementary or otherwise, is not demanded; this is the special gift of G.O.C.'s, newspaper correspondents, popular lecturers, and political leader writers.

But on the whole, so much of the work runs parallel, that it could be taken conveniently in the schools. Here is an extract of some interest. "Map reading is the daily bread, not only of the officer but also of the private, on whose initiative so much depends in modern warfare. The reading and use of what might, at some future date, serve as war maps must be unceasingly practised, and it is of great importance that the recruit should come up with some training in map reading. This preliminary work ought to be done at school by means of the map of the district. It is highly desirable from a military point of view that these should be uniform in type and that their symbols should correspond with those of the Ordnance Map. At the present day the power to understand and use the Ordnance Map is necessary for every soldier and civilian alike, and is closely bound up with national defence. It is suggested that a joint commission of teachers and military experts should report to the Survey Department." There is very little to alter in all that, but the interest lies in the fact that the speaker was Captain W. Stavenhagen of Berlin, at the Congress of German Geographers at Cologne in *1903*. Without argument as to the morality of motive thus disclosed, or the advisability of undertaking military map reading in all schools as a preparation for military work, there are several advantages

[1] "Military Map-reading Classes," W. E. Whitehouse, *Geog. Teacher*, Autumn 1915.

in treating maps from this new view point. In the first place, there must be special emphasis on accuracy to the limits of our working material. Mistakes are serious. There must be such practice that map-scales, for example, mean rather more than practice in arithmetic; a scale must *mean* something. To help in this direction, all sketch maps in text books, and for pupils' answers, should have compass points and map-scale marked, either by separate diagrams or by addition of parallels and meridians. Pupils soon think of networks in mathematical terms, and that naturally introduces the next item. In military map-reading there will be rather more elementary mathematics, so well known that it can be quickly and accurately applied.

Then there must be special skill in dealing with the third dimension on maps, not only a recognition of symbols, which is merely spelling, but the ability to "see solid" which is map-reading. In addition to its obvious value this "seeing solid" can be made interesting if well illustrated. Teachers should have available Lieutenant-Colonel H. G. Lyon's invaluable paper (*Geographical Journal*, March-April 1914).

If possible some work with geological maps and diagrams should be included in so far as they deal with shapes and characteristics of land forms[1] due to different formations, but for a still further development of this section we must await the issue of a British parallel to Salisbury and Atwood's "Interpretation of Topographic Maps." Much of the preliminary discussion of the matter from one standpoint has been set out by Mr. Ogilvie in "Cartographic Needs of Physical Geography" (*Geographical Journal*, January 1915). There is a very definite need for a good topographic atlas.

Next the military map-reading course demands more work with photographs and maps on the lines indicated by Mr. Allport in his "Aids to Map-Reading" (*Geographical Teacher*, Autumn 1913), but in addition to the sources mentioned there one can now use aeroplane photographs and maps.

There will be rather more protractor work with a high degree of accuracy—more position finding and naming by means of squares and co-ordinate cards. There will be work with maps on less usual scales, such as the 1 : 20,000 maps reduced from the 6″ Ordnance Survey Map with form line intervals of five metres. (When surplus copies of these maps become available they should prove most valuable for general school work. The sheets, apart from the microscopic letter-press in a few places, due to over-reduction, are almost ideal outline maps.) Then there must be more work with instruments; a reading to 5° with a compass will not be "near enough."[2] This means somewhat expensive instruments, and the home-made or school-made type will be less suitable in this section of the work. Plane-tabling is also particularly useful, not only on account of the principles involved, but also on account of its fairly high degree of accuracy for rapid map-making.

[1] See "Geography in relation to War," G. B. Mackie, *S.G.M.*, November 1917.

[2] An interesting exercise is to plot the error of position right or left due to an error of $x°$ along a route of y miles on any given bearing.

This is shown in recent work done in one of the zones of the armies by the Royal Engineers, where there has been much checking and correcting of military maps taken over from one of our Allies. Finally, it is advisable to include some panorama drawing. This, either from nature or from maps, is most valuable in teaching appreciation of land forms, and it is to be regretted that more of it is not attempted in ordinary school work.

But military map-reading, when all is said and done, is not a complete course of geography, nor even a complete course of map study. We can possibly make use of some parts of it to improve our ordinary map work, but, to quote the closing remark of Colonel Sir Thomas Holdich in his Presidential Address to Section E of the British Association in 1903: "The methods of further improvement are simple: better teachers and better examining, and for both it is probable that we must look more directly to civil sources than the tentative efforts of the military schools."

THE RUITOR GLACIER LAKES (PIEDMONTESE ALPS).

By C. S. Du Riche Preller, M.A., Ph.D., M.I.E.E., F.G.S., F.R.G.S., F.R.S.E.

(*With Illustrations.*)

I.—General Features. (Figs. 1 and 2.)

The conspicuous peaks and the glacier of the Ruitor massif, rising to an altitude of 2364 m. between Valgrisanche and the Little St. Bernard Pass, are familiar to all who have crossed that Pass and visited the Upper Dora Baltea Valley from Courmayeur to Aosta, or *vice versa*. The massif lies in an area of compression between the Mont Blanc and Gran Paradiso groups, a fact which largely accounts for the greatly folded and contorted character of the Palæozoic gneissic and mica-schists, and the Mesozoic calc-schists and dolomitic rocks of which it is composed. The Ruitor glacier, in two parallel wings about 4 km. in length, as well as the Val Ruitor ravine,[1] famous for its cascades, run almost due north, the drainage of the glacier discharging, in the main, by the Ruitor torrent into the La Thuile Dora, and thence, at Pré S. Didier, into the Dora Baltea of the Aosta Valley.

The whole lower northern flank of the massif, as far as it is now free from ice, between the altitudes of 2000 and 2600 m. in a length and width of about 2 km. and an average rise of 1 in 3, exhibits a series of five moraine and rock terraces in the form of an amphitheatre more or less parallel to the base of the glacier. It is in the depressions of these terraces that lakes have successively

[1] *Ruitor* is probably derived from *Ruize*=glacier, and *tor*=mountain, as suggested by Mr. Douglas W. Freshfield, though *tor* may also be a contraction of *torrente*=stream.

formed and, in the upper terraces, are still forming during the stationary or retrogressive stages of the glacier; and it is these lake basins which constitute the most characteristic feature in connection with the Ruitor glacier itself. The best known, and at one time the most typical and most formidable of them, is Lake Ruitor, which, in its essential features as a marginal glacier lake, was in the Graian Alps what the Merjelen Lake still is in the Bernese Alps. As I have

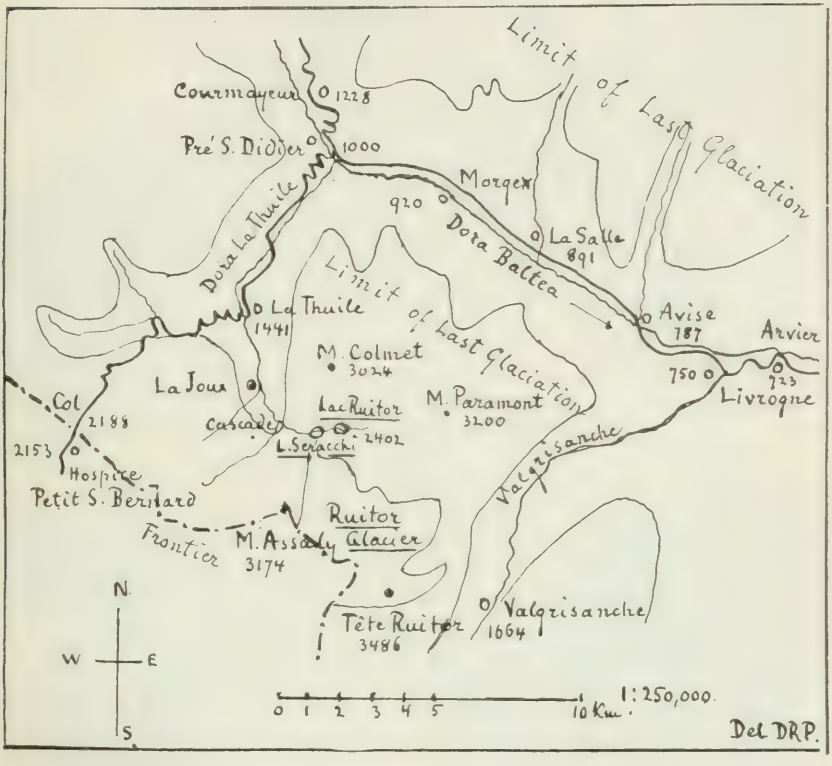

Fig. 1.—Map of Ruitor and Val d' Aosta District.

described the latter lake and its phenomena in 1896,[1] it will not be without interest now to trace the formation and characteristics of the Ruitor, of its neighbour the Seracchi, and of the associated lakes in relation to the glacier. As will be seen from the small map (Fig. 1), the Ruitor lakes and the glacier on the northern flank of the massif are conveniently reached from Pré S. Didier and La Thuile by the Little St. Bernard road, and thence by La Joux, Val Ruitor, and the cascades.

It need hardly be pointed out that the Ruitor glacier, at present much reduced in size, is one of the remnants of the great Pleistocene

[1] "The Merjelen Lake," *Geol. Magazine*, 1896, p. 97.

ice-sheet which, in the course of successive glaciations, covered practically the whole watershed of the Dora Baltea or Aosta Valley, reaching in its middle portion 135 km. in length, and a depth of at least 1000 m.[1] From here the converging glaciers of the Mont Blanc, the Monte Rosa, the Gran Paradiso, and the intermediate groups extended down to Ivrea and beyond, and on their final retreat to their respective individual and tributary valleys left the stupendous horse-shoe amphitheatre of moraine walls which project into the Po plain and rise even now to 500 m. above it. In historic times, authentic records in relation to the Ruitor glacier and its then principal lake only begin at the comparatively recent period of the fifteenth century. Both before and after the year 1430, and notably towards the end of the sixteenth century, as also in the seventeenth and eighteenth centuries, numerous disastrous floods in the upper Dora Baltea Valley are recorded as the effect of Lake Ruitor, at an altitude of 2400 m., suddenly emptying itself during the summer months. Among the more recent notices on the lake are those by Aubert, Carrel, Favre, and Baretti in the nineteenth, and by Monti in the present century, to which has recently been added (1917) a comprehensive account of the lower Ruitor region by Professor F. Sacco of Turin.[2] My own observations date back to the year 1906.

II.—The Lake Basins. (Figs. 2 and 3.)

1. *The Lower Basin.*

Lac du Glacier.—The first lake, formed towards the end of the last glaciation, was that of the depression called *Plan* and *Lac du Glacier*, whose present altitude is 2135 m., as shown in the sketch plan, Fig. 2. It probably dates from pre-historic or early historic times, when the greater part of the lower northern flank of the massif was still glaciated, and the glacier was gradually separating at its base into an eastern and a western wing. The former of these receded more rapidly, while the tongue of the latter, retreating more slowly, discharged part of its drainage into the depression formed on its margin. The lake basin

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[1] The great "Wurm" glaciation of the Aosta Valley has been described, with an admirable map, by V. Novarese, "Il Quaternario in Val d' Aosta," Parts I., II., III., *Boll. R. Com. Geol.*, 1911, p. 251; 1913, p. 304; 1915, p. 137. For the morainic amphitheatre of Ivrea, *vide* also, C. S. Du Riche Preller, "Italian Mountain Geology," *Moraine Walls and Lake Basins of Northern Italy*, 1917, p. 1. The lower limit of the last glaciation of the Ruitor and adjoining districts is marked in the small sketch-map, Fig. 1, with the ablation zone below it. The whole Dora Baltea watershed is 4332 sq. km., and the rainfall 1·6 m. per annum, giving a mean volume of the river of 215 cubic m. per second. The Dora Riparia (Mont Cenis) watershed is considerably less—*i.e.* 1231 sq. km., 1·46 m. rainfall per annum, giving a volume of 57 cubic m. per second.

[2] E. Aubert, *La Vallée d'Aoste*, Paris, 1860. G. Carrel, "Excursion au Ruitor," *Boll. Club. Alp. Ital.*, 1867. A. Favre, *Recherches Géol. Savoie, Piémont et Suisse*, 1867. M. Baretti, "Ricordi Alpini, 1873," *Boll. C. A. I.*, 1874; "Il Lago del Ruitor," *Idem*, 1879. R. Monti, *Recherches sur quelques Lacs du Massif du Ruitor*, Bruxelles, 1906; *La Circolazione della vita nei laghi, Riv. mens, di pesca*, 1907. F. Sacco, "Il Ghiaccaio ed i laghi del Ruitor," *Boll. Soc. Geol. Ital.*, 1917, p. 1.

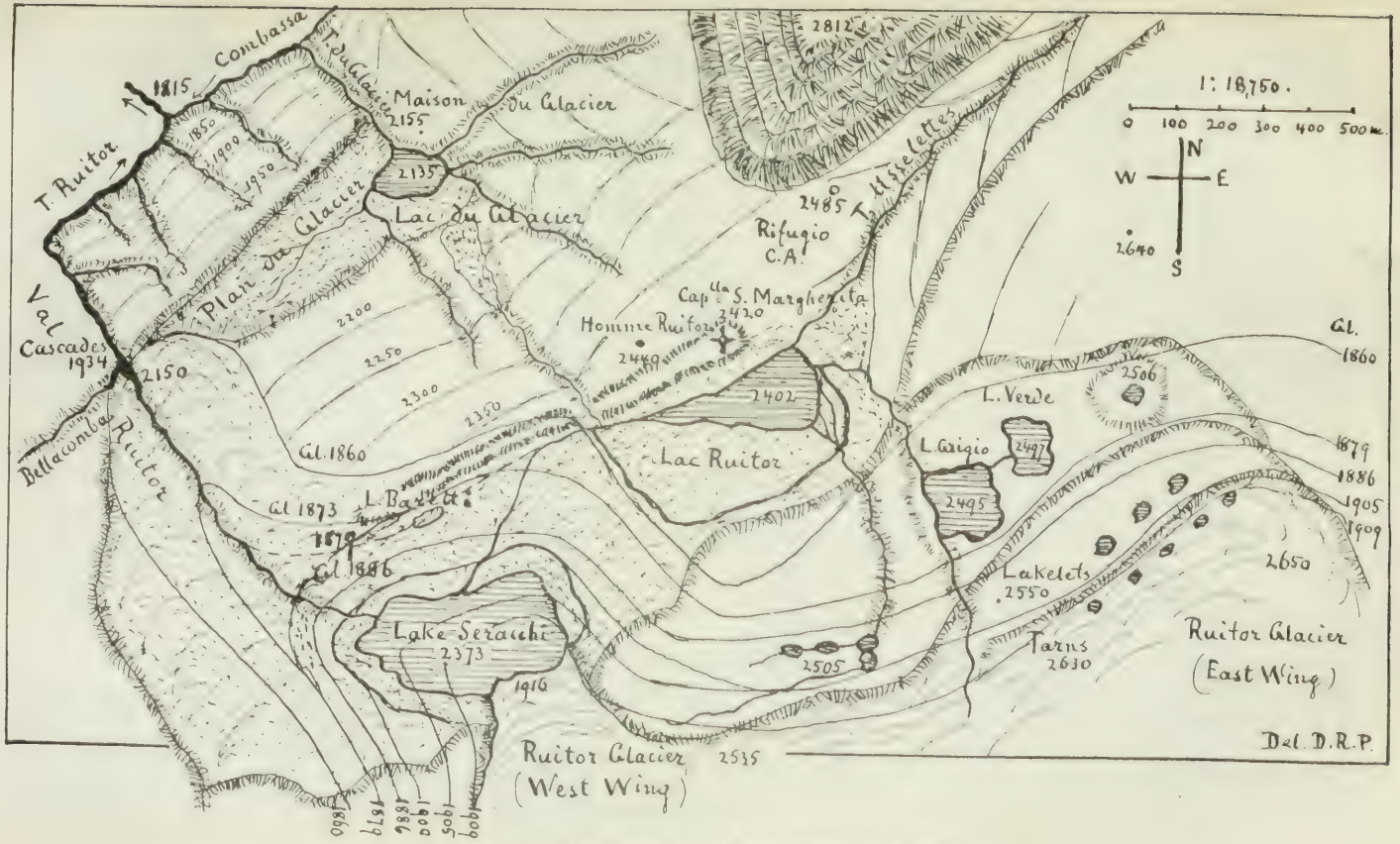

FIG. 2.—Plan of Ruitor Lake Basins and Glacier.

thus formed on the margin of the western and at the base of the eastern glacier wing, and held up by a rock and moraine wall on the north, must have been of considerable size, about 600 m. in length, and 250 to 300 m. in width. Its depth, *i.e.* the difference of level between the glacier terminal above the cascades (2150 m.) and the present lake (2135 m.) *plus* the depth of the latter, must have been at least 20 m. In its periodical emptying through overflow it was probably quite as destructive as Lake Ruitor proved to be later. Owing to the further recession of the eastern glacier wing, and the deflection of the drainage of the western wing into the Ruitor ravine gradually deepened by erosion, the Lac du Glacier shrank, the part adjoining the

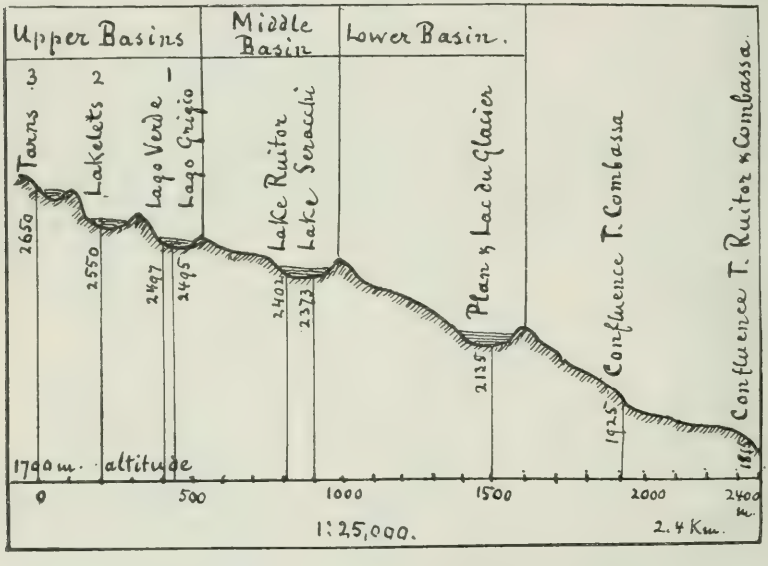

FIG. 3.—Section of Ruitor Lake Basins.

margin of the glacier being, moreover, banked by moraine and reduced to a gently inclined glacis, so that the lake itself was narrowed to a small, shallow, roughly circular basin at the eastern end not more than 5 m. in depth, and about 100 m. in diameter. Up to 1864, *i.e.* long after its severance from the western glacier tongue by moraine banks, it still received a great part of the sudden periodical discharges of Lake Ruitor by direct overflow down the mountain side 800 m. in length, the difference of level being 300 m., and the fall, therefore, 1 in 2·5. Lac du Glacier, in its turn, discharged at its northern end by its exit the "torrent du glacier" into the Combassa, thence into the La Thuile Dora, and thence into the Dora Baltea. It now receives only the drainage of the small, immediately surrounding ice-free area. The lake is mentioned, although only incidentally, by Favre in connection with his visit in 1860, the most noticeable feature being

then a fine cascade on the south side, obviously descending from Lake Ruitor.

2. *The Middle Basin.*

(1) *Lake Ruitor.*—The history of this lake is a record of extraordinary vicissitudes. Like Lac du Glacier, it was formed in a trough between the Ruitor glacier and a rock-spur—the St. Margherita spur, which name is also applied to the lake itself. Its formation was evidently of later date than that of the lower lake, and took place during the progressive recession of the glacier. Its marginal position in relation to the latter was exactly the same as that of the Merjelen Lake still is in relation to the Aletsch glacier: hence also their close analogy as regards their liability to sudden periodical discharges.

As already mentioned, authentic records of Lake Ruitor and its devastations in the Thuile and Dora Baltea valleys reach back to the early part of the fifteenth century. Disastrous floods occurred again in 1594, 1595, 1597, and 1598, so much so that several proposals were elaborated either to bank the lake artificially, *i.e.* by an effectual bar at its outlet, or to drain it by a tunnel through the rock spur, and thus provide an alternative and gradual discharge to the Lac du Glacier basin below, exactly as was done three hundred years later in the case of the Merjelen Lake. Nothing, however, came of these proposals, chiefly on account of the cost, considered excessive in those days. But the annual rupture of the lake continuing, with more or less damage in the valleys, the Bishop of Aosta, in 1603, authorised an annual procession (on July 20) from La Thuile to the lake—fully 1700 m. above the Aosta Valley, and 700 m. above La Thuile—with Mass and an invocation on the rock spur, on which latter was, moreover, in 1607, erected a chapel dedicated to St. Margherita and St. Grato.

Wonderful to relate, during the following twenty-two years the lake was on good behaviour,[1] but after that, and more especially from 1630, a new cycle of more or less serious ruptures set in, which lasted intermittently till 1679. After another period of comparative quiescence, another disastrous emptying occurred in 1751 which led to a new proposal of banking the lake, but this also fell through. At this time the lake, then 500 by 200 m. in length and width, and 35 m. in depth, had made an exit for itself by a channel across and below the glacier, which latter still overlapped the western end of the St. Margherita rock spur. That channel, however, became blocked during the winter with snow and ice, so much so that in the following spring the lake rose 25 m. above its winter level. When the subglacial channel became free through the melting of the obstructing ice, the lake suddenly emptied itself in the space of seven hours, the volume of water thus discharged and sweeping into the valley below being over three million cubic metres.

[1] The cost of the chapel was only fr. 260; that of the projected banking or tunnel fr. 13,000, or fifty times more. Thus, in the eyes of the faithful, economy and intercession had indeed worked wonders.

In most of these sudden discharges the direct and immediate cause was the yielding of the ice-wall at the point of least resistance, the wall being, moreover, weakened by the progressive recession of the glacier. But from 1752 for nearly a hundred years the Ruitor glacier shared the general, albeit slow, advance of Alpine glaciers, so that the ice-wall was reinforced and a sudden rupture and emptying of the lake was thus averted. It was during this time, and up to 1860, that the lake and its ice-wall were at their best and imposing in their grandeur. When Favre visited it in that year and made a sketch of it,[1] the glacier projected well into the lake along the surface of the latter and ended in

F. Casanova, 1886

FIG. 4.—Lake Ruitor in August 1886, with Lake Seracchi (500 m. west) in course of formation, and Ruitor Glacier projecting into it.

a sudden ice-fall, detached blocks of which were floating in the water. Another record by Aubert states that at that period the lake measured 500 by 240 m., and the ice-wall at the western end was from 50 to 60 m. in height, of which 15 to 20 m. were above the level of the lake, the depth of the latter being therefore at least 40 m. Up to that time, the principal discharge of the lake was still direct to the Lac du Glacier basin below, as is also shown by the cascade which Favre mentioned on the south side of that basin. But subsequently the moraine banks deposited by the retreating glacier barred that exit, and the discharge of Lake Ruitor was thereby deflected mainly to its new channel along the base of the glacier to the cascades of Val Ruitor.

[1] *Atlas*, 1867, Pl. xxvi. Fig. 5, A. Favre.

After 1860 the glacier began again to recede; the ice-wall which held the lake up became again weaker and more fissured, and in September 1864 the lake partially emptied itself through its new exit channel along the base of the glacier, its level dropping 10 m. in the space of ten days without doing any serious damage in the valleys. This discharge proved to be the lake's valedictory performance, for, although the glacier even up to 1873 still formed an imposing ice-fall immediately south of the lake, and still slightly overlapped the St. Margherita spur at its western end, it afterwards receded more rapidly, gradually withdrawing to a distance of 500 m. both west and south of the lake. Hence the latter steadily shrunk in size, the more so as its exit channel deepened by erosion; its depth dropped to 3 m., and in the space of twenty years, *i.e.* by 1886, it became what it is now, an ordinary small sheet of water, fed only at its eastern inlet by the Ussellettes stream and, in addition, by some glacial lakes and lakelets of the upper basins. A shadow of its former self, shorn of its beauty, but also of its terrors, it was twenty years later replaced by Lake Seracchi, about 500 m. to the west, and in the same depression.[1]

(2) *Lake Seracchi.*—This lake, called *Lago dei Seracchi*, affords a striking and instructive example of the formation of a typical glacier lake within the last thirty years. In 1860 and 1864 the western tongue of the Ruitor glacier still reached down to a point 2150 m. in altitude which, just above the Ruitor cascades, marks the confluence of the Ruitor torrent and that of Bellacomba, descending on the left from the Assaly glacier, while on the right of this point lies the old barred moraine glacis of Lac du Glacier. But from 1864 the glacier retreated steadily, so much so that when Baretti examined the locality in 1873 and again in 1879, the glacier had in fifteen years receded 700 m. in length, *i.e.* 50 m. per annum, and shrunk 350 m. in width. The glacier torrent at that time issued at 2300 m. altitude from an enormous terminal ice-fall, from whose base extended a moraine and detritus cone of 1 in 4, which reached down to the point 2150 m. in altitude, its former terminal already mentioned. Similarly the eastern glacier wing had receded fully 500 m. from the St. Margherita spur and the south side of Lake Ruitor, so that the small lakes about 100 m. above the latter were already in evidence.

It was in 1886 that, during this period of retreat, two initial lakelets appeared at the base of the western glacier tongue. Besides draining the glacier, these lakelets also received the drainage of the reduced Lake Ruitor, whose exit channel, instead of discharging direct into the glacier torrent through a small lakelet (Lago Baretti) which it had formed on the way, had been deflected from its course by a moraine bank. At that time the glacier still occupied and covered all but the whole area of the present Lake Seracchi. The latter, however, gradually expanded in the following years, and in 1905 and 1906 was further freed from ice, though the glacier tongue still projected into it in the form of a much fissured ice-fall, while numerous detached blocks were

[1] After the last discharge of the lake in 1864, the annual processions were discontinued, and the chapel was used as a refuge for mountain shepherds. The refuge of the Italian Alpine Club, erected in 1880, is about 400 m. to the east, 2460 m., or 60 m. above the lake.

floating in the turbid, dark grey water. The lake lies at 2373 m. altitude, *i.e.* 31 m. lower than, and 500 m. west of, Lake Ruitor.

Lake Seracchi thus came into existence between 1886 and 1896, and received its name—*Lago dei Seracchi*—owing to the *séracs* of the glacier tongue, from Signora Monti, a lady professor who visited the Ruitor region in 1905 for biological purposes. The glacier lake was then 11 m. in depth; its area 300 m. by 100 m. in length and width, the summer temperature of the water 1° to 2° Cent. on the surface and 4 at a depth of 9 m. The lake gradually increased in size as the glacier tongue further retreated; in 1906, 1909, and 1912 the latter still projected about 10 m. into the lake, which then measured 350 by

J. Brocherel, 1886.

FIG. 5.—Lake Seracchi in August 1909, with Ruitor Glacier projecting into it, and Lake Ruitor (reduced) 500 m. east.

170 m., while in 1916, when Professor Sacco carried out his investigations, the lake covered 400 by 200 m., or more than double its former area, and the glacier tongue was only just visible on the top of the rock-escarpment on the south side, from which small blocks of ice were still falling into the lake. The exit channel of the lake through the moraine and detritus cone down to the cascades, in a length of 700 m. has a fall of 1 in 4. Owing to the deepening of that channel by erosion, the lake level in 1916 was already 2 m. lower than in 1905, and is liable to drop still more unless the persistent retreat of the glacier gives place to a new cycle of advance.

Although Lake Seracchi cannot vie with Lake Ruitor in historical importance, it is, owing to the process of its very recent formation as a frontal, as distinguished from a marginal, glacier lake, in some respects

even more instructive, and as regards the Graian Alps not less unique than its older once terrible but decrepit neighbour.

3. *The Upper Basins.*

(1) *Lago Verde and Lago Grigio.*—Both these lakes lie about 300 m. above, and south of Lake Ruitor, Lake Verde at 2497 m. altitude, draining into Lago Grigio only 2 m. lower. Like the lakes of the lower basins, they were formed during the retreat of the Ruitor glacier, in this case the right or eastern wing. Up to 1864, *i.e.* the year of the last emptying of Lake Ruitor, the glacier still occupied the area of those two lakes, but in 1879 they were both in evidence and free from ice. Signora Monti christened them during her biological studies in 1905, from their characteristic colour, the water of the upper lake being pure and green, that of the lower turbid and grey, because fed in part direct from the glacier. Signora Monti found the depth to be 3 m. and 10 m. respectively, though it is probably somewhat less now, as their volume is shrinking. In 1916 Lago Verde measured 100 by 100 m., Lago Grigio 200 by 150 m., their combined area thus being about 40,000 sq. m., or half the area of Lake Seracchi. About 300 m. east of Lago Verde lies a small rock-bound, ice-free lake at altitude 2567 m., which has, however, no superficial exit either to Lago Verde or to Lake Ruitor. Both Lago Verde and Lago Grigio lie in a moraine banked basin, and drain through the exit channel of the last-named direct into Lake Ruitor.

(2) *Lakelets and Tarns.*—In a depression along the base of the glacier, at an altitude of 2550 m., or 50 m. above the preceding two lakes, lies a series of four lakelets, and more to the west, at 2500 m. altitude, another series of three lakelets, of which the first series probably drains underground into the lower basins, while the second series drains direct into Lake Ruitor. These are all lakelets formed since 1880, *i.e.* within the last thirty years, at the base, *i.e.* at the frontal terminal, and not on the margin of the retreating eastern wing of the glacier, which is at present about 100 m. higher up.

Lastly, at an altitude of 2650 m., in part in the present terminal moraine, in part in the glacier itself, lies a string of tarns which are either already formed, or are in course of formation as the glacier retreats. The formation of new tarns will obviously continue as long as the recession of the glacier is not arrested or gives place to a period of advance.

The Ruitor lake-basins in five terraces are shown in the plan[1] and section Figs. 2 and 3, and are summarised in the following Table A, which gives their approximate former maximum, as well as their present reduced areas. Lakes Ruitor and Seracchi are also conspicuously shown in the accompanying photographs Figs. 4 and 5, taken in 1886 and 1909 respectively.[2] Table B summarises the periods of oscillation of the glacier as directly determining the behaviour of Lake Ruitor. Table C summarises the phases of formation of Lake Seracchi.

[1] The plan is reduced from Professor Sacco's contour-plan of 1917.

[2] These photographs are reproduced from Professor Sacco's copies of the originals.

Table A.—Summary of Ruitor Glacier Lakes.

	Altitude.	Maximum Areas.			Present Areas.			
	M.	M.	Sq. M.	Depth. M.	M.	Sq. M.	Depth. M.	
I. Lower Basin—								
Lac du Glacier, . .	2135	600 × 270	160,000	20	157 × 140	20,000	5	Maximum at end of last glaciation.
II. Middle Basin—								
Lake Ruitor, . .	2402	500 × 240	120,000	40	$\frac{400 \times 1500}{2}$	30,000	3	,, 1400 to 1864.
Lake Seracchi, . .	2373	400 × 200	80,000	11	400 × 200	80,000	9	,, 1900 to 1916.
III. Upper Basins—								
1. Lago Verde, . .	2497	100 × 100	40,000	5	100 × 100	10,000	3	,, 1905 to 1916.
Lago Grigio, . .	2495	200 × 150		12	200 × 150	30,000	10	,, 1905 to 1916.
2. Lakelets, . .	2550	20 × 20	400	2	20 × 20	400	2	,, 1916.
3. Tarns, . . .	2650	10 × 10	100	1	10 × 10	100	1	,, 1916.

Table B.—Oscillations of Glacier and Lake Ruitor.

Periods.	Glacier.	Lake.	
1400-1607, . . .	Retreating.	Sudden disastrous discharges.	
1608-1629, . . .	Stationary.	Quiescent.	
1630-1679, . . .	Retreating.	Sudden disastrous discharges.	
1680-1759, . . .	Advancing.	Quiescent.	
1751, ...	Retreating.	Sudden disastrous discharge.	
1752-1860, . . .	Advancing.	Quiescent.	Maximum area 500 × 240; depth 40 m.
1861-1864, . . .	Retreating.	Last partial, harmless discharge.	
1865-1873, . . .	Still projecting into lake.	Lake shrinking.	
1874-1886, . . .	Retreating from lake.	Ice-free and shrinking.	Depth 3 m.
1887-1916, . . .	500 metres from lake.	Shrinking to half its former size.	Minimum area 200 × 75 m.

TABLE C.—PHASES OF FORMATION OF LAKE SERACCHI.

PERIODS.	GLACIER.	LAKE.
1886, . .	Retreating, but still covering whole area of lake.	Two lakelets forming at base of glacier.
1905, . .	Retreating, but projecting well into lake.	Lake partially formed, 300 × 100 m. = 30,000 sq. m.; Depth, 11 m.
1912, . .	Retreating, but still projecting into lake.	Area of lake further increased, 350 × 170 m. = 60,000 sq. m.
1916, . .	Retreating, but still overlapping edge of rock wall on south side.	Lake ice-free, maximum area, 400 × 200 m. = 80,000 sq. m. Depth of lake drops to 9 m., with tendency to further drop.

III.—CONCLUSION.

The general conclusions to be drawn from the foregoing examination of the Ruitor Glacier Lakes are as follows:—

1. The lakes, lakelets, and tarns of the lower northern flank of the Ruitor massif, from 2000 to 2600 m. altitude, constitute collectively a system of five terraced overflow lake basins in ascending order, banked by rock and moraine walls, and formed in the course of the retreat of the glacier, some on the margin, others, more especially the upper ones, at the frontal base of the glacier tongue.[1]

2. The process of formation of the Ruitor lake basins, whether frontal or marginal, was in all cases substantially the same. Upon the glacier, after a stationary stage, retreating from its terminal or marginal moraine bank or rock-bar, the depression behind these collected the glacier drainage, expanding and deepening to a lake which at the overflow or lowest point of the bar gradually cut its exit channel through the moraine, or slowly eroded a passage through the rock bar. The successive terraces and lake basins thus mark at once the stationary and the retreating periods of the glacier.

3. Owing to loss by evaporation, but in a greatly enhanced degree by percolation through the permeable moraine banks and underlying calc-schist and limestone strata, the ordinary, albeit copious, rainfall of 1·5 to 2 m. per annum[2] is not *per se* sufficient to maintain the lakes. Hence these depend for their existence on the supply from the Ruitor glacier. This supply increases, is constant, or decreases according as the glacier advances, is stationary, or retreats, the oscillations being governed by periodical changes of temperature and precipitation in the

[1] The Ruitor lake-basins are, in some respects, not unlike "the ancient glacier overflow lakes" of Cleveland (Yorks) and Black Combe (S. W. Cumberland), described by P. F. Kendall and B. Smith respectively in *Q.J.G.S.*, 1902, p. 471, and 1912, p. 402.

[2] The rainfall registered in 1900 at the Little St. Bernard Hospice, altitude 2153 m., the same as the Ruitor cascades, was 1·609 m.

nevé zone of the glacier, above the upper snow-line, now at about 3000 m. altitude.[1]

4. The lower northern flank of the Ruitor massif, covering a now ice-denuded area of about 4 sq. km., exhibits a series of striated and polished rock-spurs, as the effect of considerable glacial abrasion. The narrow and deep Ruitor ravine, *i.e.* Val Ruitor, is not due to glacial action, but primarily to fluviatile erosion by the glacier torrent wedged between the Ruitor glacier and the formerly parallel and contiguous glacier of Bellacomba or Mte. Assaly, 7 km. east of the Little St. Bernard Pass.

5. The Ruitor glacier has, since 1864, receded roughly one km., *i.e.* at the average rate of 20 m. per annum. A fresh advance at the same by no means rapid rate would again glaciate and bury Lake Seracchi in ten, Lake Ruitor in thirty, and the Lac du Glacier basin in fifty years. If, however, the advance stopped short of the Lac du Glacier basin, the latter would fill again and become once more what it must have been in early historic times, the principal collecting basin of the northern flank of the Ruitor massif.[2]

A NEW MEDIUM FOR THE CONSTRUCTION OF GEOGRAPHICAL MODELS.

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(*With Diagrams.*)

The value of models in geographical teaching is patent to every thoughtful teacher, and the chief obstacles in the way of their constant use in schools are (1) the time and trouble involved in making them; (2) their cost when they have to be purchased; and (3) the poor quality of such as are placed on the market at a reasonable price.

Difficulties in construction result from the methods and materials usually employed. Into a discussion of the merits and defects of these we cannot now enter. During the past twenty years I have tried all the methods and materials recommended in books and magazine articles, as well as others of which no account has, so far as I know, been published. Of all the materials experimented with none has been found so suitable in every way as moulders' sand, used in the manner to be described in the sequel.

Moulders' sand is quartz sand with an admixture of about 4 per cent.

[1] At the time of the last glaciation the limit of the upper snow-line was only at 2000 m. altitude.

[2] Artificially, *i.e.* for hydro-electric power purposes, the Lac du Glacier basin could even now, and no doubt in the near future will, be used for collecting the greater part of the glacial and ordinary drainage of the northern flank of Ruitor, including the upper lakes. The drainage area of the glacier is 9 sq. km., that of the whole Ruitor Valley 40 sq. km., total about 50 sq. km.

of clay: it can be procured at a merely nominal cost from any foundry or place where metal-casting is done.

The sand is prepared for use by moistening with the minimum amount of water required to make it set well on drying. The amount of water to be added can be determined by experimenting with small quantities and adding different proportions of water. If too much water be added, the sand adheres to the fingers, and shrinkage cracks develop in the model on drying. A model need not be considered a failure, however, even though cracks do appear. The cracks can readily be healed by moistening the part of the model in which they occur and pressing into them with a modelling tool a little damp sand.[1]

The sand, properly moistened, can be used either in accurate modelling from contoured maps or in free modelling of typical land forms.

Accurate Modelling from Contoured Maps.

I have not attempted to use the sand in constructing accurate models on the scale of one inch to the mile, though there would be no difficulty in doing so. But for teaching purposes that scale is in general too small: minor features shown on the map are, whatever the material used, difficult to represent, and equally difficult to recognise. The scales found most suitable are two to twelve inches to the mile.

Whatever the horizontal scale fixed upon, the vertical scale may with advantage be exaggerated. A model is viewed obliquely from above: vertical distances are foreshortened; and, if the vertical scale be the same as the horizontal, the result is an apparent flattening. If the district modelled does not possess strong relief, this is true even when the horizontal scale is as large as 12 inches to the mile.

The horizontal scale on which it is proposed to construct the model having been determined, a map on that scale must be got or prepared. Enlargements (or reductions) from the one-inch and six-inch maps may be made by pantograph, contour lines and streams alone being shown. A very convenient scale is 2·54 inches to the mile. A map on this scale may be prepared by tracing contours and rivers from the one-inch map on paper ruled in millimetre and centimetre squares, and plotting all the lines so traced on paper ruled in tenth-of-an-inch and inch squares. Two copies of the map of the area to be modelled should be prepared, the second being traced from the first.

The next step is to prepare a base-board on which to build the model. The base-board should be of thoroughly seasoned wood, *e.g.* a piece of an old blackboard or a drawing-board. The thickness of the wood should be such that the board is *practically rigid under the weight of the model built upon it*. To prevent warping or "give," the base-board may be strengthened by cross-pieces screwed on to the lower side; a coat of paint or varnish on the upper side renders it waterproof so that

[1] The first model, in the construction of which I first—ten years ago—used the sand, cracked badly on account of the addition of too much water; but it is still in existence, and no cracks are now visible.

the board will not absorb moisture from the damp sand and crack on drying.

On the base-board paste one copy of the map. Along the contours place dots where the lines change direction, and mark all the intermediate levels shown. On the spare copy of the map place dots in exactly the same positions. At each dot pierce with a bradawl a hole in the base-board about ·25 inch deep.

Procure a supply of iron wire,[1] and cut with a pair of pliers a number of pieces corresponding in length to the heights indicated by the contours, plus ·25 inch. Thus, if the vertical scale chosen be ·1 inch = 100 feet, for the 900-feet contour wires ·9 inch + ·25 inch long will be required.

Each piece of wire should now be gripped in the pliers, ·25 inch from one end, and forced into one of the holes until the pliers are stopped by the base-board. Proceed in this way till all the wires are fixed. Each should be tested to see if it projects to the proper height above the board, but this will hardly be necessary if the wires have been accurately cut and accurately held in the pliers.

It is, of course, essential that the wires should be perpendicular to the surface of the board; and perpendicularity may be tested by means of a set square, the square being applied to the wire peg from two directions at right angles to each other, and the peg set strictly perpendicular (if not already so) by the pliers. To test perpendicularity one may use a combination of three small set squares, two vertical and one horizontal, glued together; if the vertical edges of the vertical squares be graduated in inches and tenths, the height of the peg may be tested at the same time.

The fitting of the wires is the most tedious and time-devouring part of the whole operation, and on the judicious selection of the points at which they are to be inserted depends the ease and accuracy with which the actual modelling may be done. The number of pegs can be materially reduced by noting where there are even slopes, *i.e.* where the contours are equally spaced, and pegging only the highest and lowest contours. In modelling hilly country attention to this point saves a deal of time and trouble.

If the model shows any part of the sea, sea-level had better be fixed at ·25 to ·5 inch above the base-board, and the pegs correspondingly increased in length. This is necessary for reasons to be assigned later.

Usually some or all of the edges of the model will show a section of the earth's crust extending to a certain depth, and must be built up perpendicular to the base-board. This can be done by using a framework of wood that can be adjusted to the dimensions of any model likely to be required (Fig. 1). The four pieces, $A^1 - A^4$, can be screwed firmly together; like the base-board, they should be painted to prevent wetting by the moist sand to be packed against them.

On the four sides of the framework paste the section (cut out of a

[1] Straight "flower wire" (to be had from any wire-worker) serves well. The bradawl used in piercing the holes should have a diameter rather less than that of the wire.

piece of paper) which each side of the model will present when finished: this obviates the necessity of inserting pegs close to the edge of the model.

When the frame is placed in position, its lower inner edges must coincide with the margins of the map pasted on the base-board; and it may be screwed down by means of iron angle-pieces (*e*, Fig. 1).

The actual modelling may now be begun, and consists in packing moist sand between, and up to the level of the tops of, the pegs. The packing may be done by dropping sand between the pegs and ramming it down firmly with the fingers or with a round, flat-ended piece of metal or wood—a pencil serves the purpose well when the pegs are close together. The surface must be finished off with a modelling tool such as any art dealer can supply.

The packing of the sand may proceed quite rapidly till only ·1 inch or so of the pegs remains exposed to view. The finishing of the surface requires some time and care; and during its progress constant reference

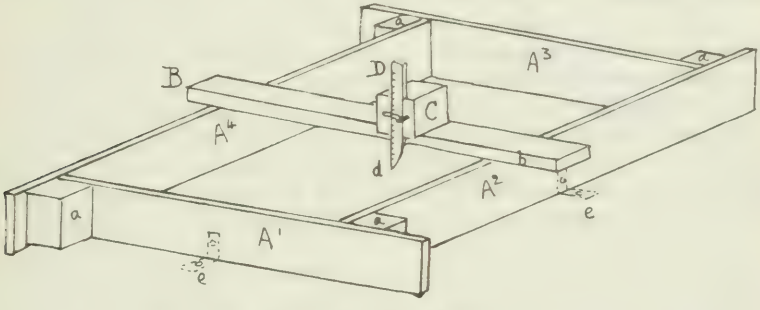

Fig. 1.—Modelling Frame.

a, *a*, *a*, *a*, Rectangular hardwood blocks to which A^1—A^4 can be screwed.

should be made to the hachured edition of the one-inch map of the area represented, so that all minor features not indicated by the contours may as far as possible be shown.

While the modelling is in progress, it is important to avoid covering the pegs with sand. Should any of them be covered out of sight—as may readily happen on steep slopes—one may locate them by reference to the spare map. This, indeed, is the reason why the map should be in duplicate. When the work is finished the tops of the pegs should be flush with the surface of the sand.

The model is now set aside to dry, a process which will vary in duration with the thickness of sand within the frame and the season of the year; *do not apply artificial heat.* When the model is thoroughly dry, fill up any cracks that may have developed.

It will now be found that, though the sand feels quite hard to the touch, its surface may be rubbed away grain by grain. It is therefore not suitable for painting on with oil colours until it has been fixed. A good, cheap, and easily prepared fixative is a solution of gum arabic (1 part of the ordinary commercial solution to 3 to 5 parts of water).

The fixative should be dabbed on with a soft brush, not applied by strokes of the brush. The fixative causes a perfectly hard skin to form on the surface of the model and any sort of oil colour [1] can be freely applied with a brush in the ordinary way.

After the model has dried, the frame may be removed. If, however, it is to be subjected to frequent lifting and carrying from place to place, the model should be surrounded by a permanent frame of slips of thin wood: chipping of the edges is thus prevented. For a model intended simply to be exhibited in a case a permanent frame will not be necessary. But the edges, on removal of the temporary frame, may show vacuities due to imperfect packing of the sand; these can be filled up with a little moist sand applied with a modelling tool. The edges should then be treated with a fixative and painted or not.

It has been pointed out that, if the model shows any part of the sea, sea-level had better be fixed ·25 to ·5 inch above the base-board. A very thin layer of the "set" sand, such as would probably form the coastal district in the model, would be easily broken; and on that account it is well to have no excessively thin layer. Further, it would seem that the application of the gum fixative forms a skin that expands and contracts with variations of atmospheric moisture and temperature, and the edges of thin layers tend to rise off the base-board in warm, dry weather. This tendency is eliminated when the layer is moderately thick. Over the area representing the sea a few pegs can be fixed with their tops at sea-level (*i.e.* ·25 to ·5 inch above the base-board): these effectually counteract any tendency towards buckling with a rise of temperature.

It will readily be understood that to construct a geological model showing vertical sections some slight modification of the methods described above will be necessary. The model will be made in two or more pieces according to the number of sections to be shown. The edges formed by planes of section must be flush with the edges of the base-board; the temporary frames must be adjusted accordingly; and, if the section pass obliquely across the model, base-boards and frames may not be rectangular.

Free Modelling of typical Land-Forms.

By free modelling of typical land-forms is meant modelling in which, while all the truth of nature is retained, no attempt is made to copy slavishly her every detail. A model intended to exhibit a land-form as the result of some process or processes of denudation need not be an exact copy of, though it should be based upon, some typical example. It is in this sort of work that the excellence of moulders' sand as a modelling material is most evident.

Start with a clear conception of what the model is to show; embody

[1] Some of the "water paints" used in decorating walls (*e.g.* Walpamur) are as suitable as oil paints, and dry with a nice, dull surface; but if laid on too thickly the coat of colour tends to crack.

this in a rough sketch-map on the same horizontal scale as the projected model; and proceed to build up the physical features. The finished model may be fixed and coloured so as to show grass, woodland, heath, rock, sand, etc., in something like their natural colours. If the model be at all complicated it may be well to fix a few pegs in order to keep heights and distances in a reasonably natural relation. These pegs will also prevent the model from slipping off the base-board when handled.

There is hardly any limit to the variety of models that may be made in this way at small expenditure of time and trouble to illustrate physiographical processes and their results.

If one possesses a fairly good eye, one may produce quite rapidly a pretty accurate model of any district on any scale by a process that may be described as "semi-free" modelling. Say that we wish to model an area measuring 6 inches by 5 inches on the one-inch map, and to do so on a horizontal scale of 3 inches = 1 mile, and a vertical scale of ·1 inch = 100 feet. Adjust the frame $A^1 - A^4$ (Fig. 1) to enclose a space of 18 inches by 15 inches. Along the upper edges of the sides A^2 and A^4 paste paper scales marked in inches and tenths. A perfectly straight and fairly strong strip of accurately squared wood, B, should have a similar scale pasted on one edge, b. A cube, C, of hard wood has a groove cut down one face perpendicularly to the upper and lower edges. Into the groove a small rule, D, graduated in inches and tenths, is fitted so as to slide up and down quite easily, and is held in position by a clip similar to those by which slides are kept in position on the stage of a microscope.

Attention to the graduation of D will facilitate the determination of heights on the model. When D is lowered and d touches the base-board, zero should be opposite a fixed mark on C and the inches should be numbered from zero *downwards*. When D is raised, the distance of d above the base-board can be read off at once. Thus the reading 1·5 means that d is (to scale) 1500 feet above the base of the model.

The portion of the map to be modelled is ruled off into inch-squares, the intersecting lines forming co-ordinates by which the position of any point may be found with little trouble; or, better still, squared tracing-paper ruled in inches and tenths may be pinned over the map.

Now commence building up the model within the frame, trusting at first to the eye alone. Let us suppose that x is a prominent point on the map and of known elevation. It is easy to see how its proper position in the model may be determined by means of the scales on A^2, A^4, B, and D, it being always kept in mind that horizontal distances on the map have to be made three times as large in the model. If a mistake has been made in the modelling, it may be corrected by removing or adding sand. Moreover B and D may be adjusted to show the position of x, and left in place until the modelling has been carried up to, or nearly up to, that point. In this way a tolerably accurate model of a considerable area may be constructed in a few hours.

It will readily be understood that B, C, and D may be so manipulated as to enable one to draw contour lines on the surface of any model.

Needless to say, the use of a contoured model and the corresponding map greatly facilitates the teaching—and understanding—of the meaning of contour lines: quite young children, when taught in this way, find little difficulty in reading contoured maps. Further, this is surely a simpler and more accurate way of contouring a model than immersing it to successively greater and greater depths in a tank of water, though the latter is a method recommended in many articles in the teaching of geography.

A still more effective way of teaching the meaning of contour lines is to get the pupils to construct (by free modelling) simple models, and to mark the contours for themselves. The contouring is readily performed by means of the simple instrument depicted in Figure 2. A map showing the contour lines—it need not be mathematically accurate

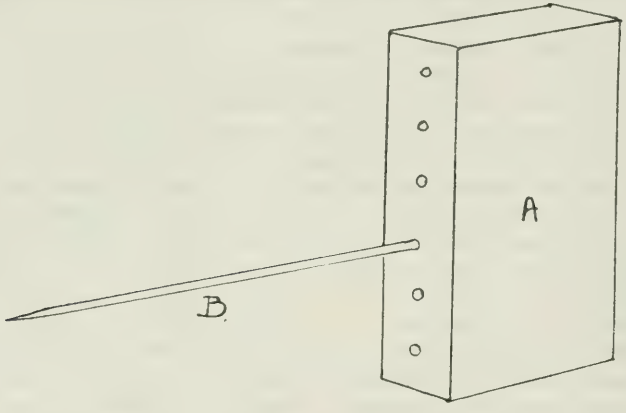

FIG. 2.—Simple apparatus for contouring Models.

A Rectangular block of wood, 3·5″ × 2″ and ·75″. Holes 1·5″ deep are bored parallel to the top and bottom of the block. The intervals between the holes may represent 100′, 50′, etc.
B Pointed steel wire fitting accurately into the holes.

—is then made by each pupil from his model; and the space between each pair of lines may, if desired, be coloured on the layer system. A child of ten may thus be taught to make a really intelligent use of orographical maps: even section-drawing—a much abused process in the teaching of so-called "practical" geography—ceases to be a mystery, provided the pupil first constructs sections across his own maps, and is able to compare these sections with the actual model (which may readily be cut along the line of section).

As a modelling material moulders' sand possesses many advantages over all other materials in use:

(1) It is cheap (pre-war price 1s. per cwt.).

(2) It is cleanly to work with—a strong recommendation for a material to be used by children.

(3) It does not to any appreciable extent shrink and crack in drying.

(4) The model can be left unfinished at any stage, and work resumed

at any time. On resuming work after a considerable interval (during which the sand already built up may have become dry or nearly so), sprinkle the surface with a *fine* watering-can or dab it with a soft brush dipped in water.

(5) By suitable means its surface may be made to take colours.

(6) To obtain a permanent model, no cast—with its messy accompaniments—requires to be made, though plaster casts may readily be taken from the finished model.

(7) Should the surface of a finished model be chipped, the damage can be repaired—so as to leave absolutely no trace—by moistening the fractured surface and applying damp sand.

(8) The "set" sand of old models merely requires to be moistened in order to be ready for further use: the same material can be used over and over again.

(9) By its use, and by following the methods here described, accurate models can be constructed in less time than by employing any other material or method. A model of 48 square miles of complicated mountainous ground in the Eastern Grampians, on a horizontal scale of 2·54 inches to the mile and a vertical scale of ·1 inch to 100 feet, has been completed in thirty-two hours: models of equal size, but showing simpler country, have been finished in less than half that time. By using "free" methods models of the greatest educational value may be finished (except for colouring) in an afternoon.[1]

In conclusion, it may not be out of place to mention some models, made as described above, which have been found of service in the instruction of pupils from nine to eighteen years of age:—

1. A large contoured model (20 ins. by 30 ins. or thereby) for use in instructing junior pupils in map-reading, with five maps to correspond, viz.—Map 1, with coastline, roads, and rivers only; Map 2, with relief shown by shading; Map 3, with relief shown by contour lines; Map 4, with relief shown by shading and contour lines; Map 5, with relief shown by colouring in layers (as in Bartholomew's Reduced Ordnance Survey Maps).

2. A number of small contoured models (10 ins. by 8 ins. or thereby) of typical land-forms (free-modelled), with corresponding maps, for more advanced instruction in map-reading. Senior pupils are required to draw maps of the models, two or three individuals working on each model simultaneously. The pupils indicate elevation (*a*) by contour lines only; (*b*) by shading, the darkest shading indicating the steepest slopes and giving (at a little distance) the same effect as hachuring; (*c*) by contour lines and shading; (*d*) by colouring in layers. Pupils may also be required later to build models (by free-modelling) from the maps, the teacher's models being kept out of sight. The set of pupils that mapped one model should now get a map of a different model to work from.

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[1] *Note.*—For the construction of models red (Birmingham) sand is preferable to yellow (Thames?) sand: the trade name for both seems to be "yellow" sand. The present (1918) price per cwt. is 2s. 6d.

3. Volcano of Vesuvian type—old cone, new cone, lava flows, radial drainage, diversion and damming of streams by lava flows.

4. Glacier—snowfields, nunataks, crevasses, lateral, medial, and terminal moraines, ice-dammed lake.

5. A glaciated district showing over-deepened U-shaped valleys, truncated spurs, hanging lateral valleys, corries, and corrie-lakes (*e.g.* S.E. corner of Sheet 65, Ordnance Map of Scotland).

6. Plateaux (=elevated peneplains) in different stages of dissection by rejuvenated streams.

7. A river series illustrating—(1) The origin of water-gaps; (2) The origin of waterfalls and rapids; (3) How a winding river widens its valley—ox-bow lakes, severed spurs, etc.; (4) River terraces; (5) Alluvial fans; (6) Deltas; (7) River valleys in youth, maturity and old age; (8) River capture—the law of unequal slopes.

8. A pair of models showing (1) a mountainous district that has suffered recent partial submergence—young coastline, and drowned valleys; (2) the same district with old coastline. (This pair is founded on Mid Wales from north of Barmouth south to Aberystwyth, and includes the lower parts of the basins of the Mawddach and Dovey.)

9. Part of Forfarshire from the Highland border to the sea, in two pieces, showing section across syncline and anticline of Old Red Sandstone.

10. Fringing reef, barrier reef, atoll.

TIDAL LANDS: THEIR PROTECTION AND RECLAMATION.[1]

The importance of protecting our coastline, and of gaining new land from the sea, as well as of preventing the destruction of good land by drifting sand dunes, is at all times great, but the matter is now more worthy of attention than ever in connection with the better development of the land for food production and general industry. The interesting and well-illustrated treatise named below is written by an engineer and a botanist, each author describing his own section of what is in reality a complex subject with many ramifications. Such a combination as this is not common, but between them a very useful and readable book has been produced that will be welcomed by all practical patriots in search of the best means of improving our natural resources and conserving the sea margin of these islands. The subject is a large one, and the engineer does not profess to say nearly all that can be said, but what he deals with in the first three chapters on the nature of tides, currents, and winds, and the methods of river training and foreshore reclamation, forms a useful introduction to the next three chapters on the botanical aspects of the question, and to the practical matters that follow.

The work of vegetation on the shore in occupying and colonising sea beaches thrown up by the waves, foreshores, and the sand dunes

[1] *Tidal Lands: A Study of Shore Problems.* By Alfred E. Carey, M.Inst.C.E., F.R.G.S., etc., and Professor F. W. Oliver, F.R.S. Blackie and Son, 1918. Price 12s. 6d.

that threaten to smother the adjacent hinterland in some districts, is an absorbing branch of applied botanical science. The British coastline is being washed away at many exposed places, but at other spots, in the numerous sheltered bays and estuaries, new land is constantly being formed, partly by laborious human work and partly by slow natural processes of accretion that can be greatly accelerated by the application of scientific skill and knowledge. Examples of this scientific treatment of the sea margin, of methods to follow or to avoid, and of the latest discoveries and their practical application, form the theme of the remaining chapters.

The Report of the Royal Commission on Coast Erosion assures us that there is no cause for general alarm, since far more land is being acquired from the sea at some places than is being washed away at others. But the acquisition of additional land can and might be extended considerably, and at comparatively small cost, by modern scientific methods. Now here we are given useful details of a very simple botanical method by which foreshore reclamation can be easily promoted in suitable places. The *Psamma* or Marram grass, which only thrives on dry ground, has long been known to be of the first importance for fixing the drifting of sand dunes above sea-level; but the *Spartina* or Rice grass, which grows in salt water, has in more recent years been found of great use in promoting the accretion of mud within tidal waters. This is an important botanical discovery which deserves more attention than it has yet received. The authors do well to give prominence to it in chapter x., and a few particulars deserve mention here.

Spartina or "Rice Grass" appears to be mainly a native of America, where some eighteen species are known. Most of these grow on salt soils or on the coast, in or close to the water. About four species are indigenous to Europe, but of these *Spartina Townsendii* is the one which claims attention now. It first came to public notice in 1907, when Lord Montagu of Beaulieu reported to the Coast Erosion Commission on its potentialities, but it had been recorded at Hythe on Southampton Water as early as 1870. Twenty years later it was spreading rapidly over the mud flats, and now occupies thousands of acres round Southampton and the Isle of Wight, and has been established on the coasts of Kent and Norfolk for some years. The plant has a vigorous stalk two to four or five feet high, and it spreads out by root stolons and by seed, forming tufts and colonies that rapidly expand and coalesce on the surface of shallow muddy foreshores covered by a few feet of tidal water every day. Once it is well established, the mud in the water is entangled and collected between the stems and leaves at high tide, so that the rate of accretion is greatly increased. It grows where the water is too deep at high tide for the ordinary maritime plants of saltings or sea marshes. The saltings are thus enabled to spread seawards much faster than before the *Spartina* appeared on the scene. Its value is thus fully established as a natural promoter of foreshore reclamation. The grass appears to be of considerable value for fodder, and in America horses are said to be fond of it for grazing.

If it can be successfully introduced to places farther north, where

the climate is cooler than in the south of England, the visitor will be warmly welcomed. A few years ago, at the beginning of the war, half a dozen plants were brought to the Firth of Forth and planted by Dr. W. G. Smith, of the East of Scotland College of Agriculture, on the suggestion of Dr. R. B. Greig, of the Scottish Board of Agriculture, by way of a preliminary experiment. These are now firmly established with deep roots in the sandy mud and are beginning to spread, but the growth has not been considerable, and it is still too soon to form any decided opinion as to whether the *Spartina* will thrive and spread on the Scottish coast, where great possibilities may be awaiting it.

Many other interesting points are discussed in these pages, but two may be noticed, and these are under the engineering category. The disastrous effect of permitting sand to be removed from an exposed shore is well illustrated in the case of Hallsands in Start Bay (p. 247). Here the cliffs, at whose base the hamlet stood, were fronted by a beach 150 feet wide, of which a strip 60 feet wide was from 9 to 14 feet above high-water mark. Sea walls had been built in 1841, and the beach afforded adequate protection against the waves. In 1896 Sir John Jackson was permitted by the Board of Trade to dredge sand and gravel opposite Hallsands to construct Devonport Dockyard, and some 650,000 cubic yards were so removed. In consequence of this the beach level was reduced at places to twelve feet, and in 1901 the sea walls were undermined and fell to pieces. The *coup de grâce* was given in January 1917, when the whole hamlet was destroyed by a storm that demolished the defenceless houses. Photographs are given of the place before and after the disaster caused by the thoughtlessness of the Board of Trade and the contractor.

The last chapter, under the paradoxical heading "Air Reefs," relates a curious and apparently very important discovery of a way of mitigating the destructive effects of ocean waves on exposed objects and harbour works. By means of a perforated iron pipe, laid on the sea bottom, outside the weather quarter of the exposed spot, compressed air is forced into the sea at a point where it can rise through the water and expand. The waves then become quite obliterated and deprived of their destructive power. The rising bubbles in some mysterious way behave like a protecting reef of rock and effectually calm the breakers in their vicinity. The Brasher system, as this is called, has been successfully operated in America, notably at El Segundo in California, by the Standard Oil Company, where heavy storms do immense damage along the exposed coast. After the first initial outlay on the plant, the cost of operating the system is small. During a heavy gale the plant was in operation for twenty-three hours at a cost of only £12. A ship can thus lie at a jetty, in a lagoon of safety, outside of which there is a mass of broken water, and the apparatus can be switched off as soon as the storm has abated. Oil has been proverbially a calmer of troubled waters from the earliest times, but air when once conveyed to the spot in this submarine way seems a much cheaper and more effective agent for such pacific purposes, as it not only prevents the waves from breaking, but entirely neutralises them and lays them low.

The book is to be welcomed for its useful and practical information, and for the attractive way in which the facts and observations have been presented.

H. M. CADELL.

GEOGRAPHICAL NOTES.

ASIA.

The Resources and the Future of Temperate and Sub-tropical Asia.—To the issue of the periodical *Asia* for June last Professor Ellsworth Huntington contributes an article on the resources of the Turkish and Russian possessions in Asia, and the possible results to the world if Germany were permitted to establish a hold on these, and given the chance of extension into northern Persia, Afghanistan, and Chinese territories. The article is illustrated by a series of useful maps, and the author lays great stress upon the present and probable future supplies of cotton, wood, animal products (including furs), and minerals, especially oil, copper, platinum, gold, and so forth. The article is written primarily with a propagandist aim, but it is worthy of note by the geographer owing to the number of interesting facts which it contains.

AFRICA.

New Geographical Journal.—We have received the first issue of the *South African Geographical Journal*, the organ of the recently founded South African Geographical Society, which has been placed upon our list of exchanges. The *Journal* is published under the honorary editorship of Mr. J. Hutcheon, Lecturer in Geography in the School of Technology and Mines, Johannesburg, who has had much to do with the founding of the new Society. The first issue contains, *inter alia*, excerpts from a lecture delivered by Mr. Hutcheon at the inaugural meeting of the Society on June 8, 1917. The lecture dealt in general with the subject of geography and its place in education, and in some detail with the aims and objects of the Society, which, our members will be interested to notice, is to be organised on the general lines of the Royal Scottish Geographical Society, the headquarters being at Johannesburg, while other centres are to be established wherever ten or more members agree to meet regularly.

As set forth in the paper, the Society has before it a somewhat extensive plan of work. Its fundamental aim is stated to be to raise the standard of the subject in South Africa, and to safeguard the interests of those teaching it, as well as to arouse in the general public enthusiasm for geography. As means to be adopted in promoting these ends, a *Journal* is to be published at such intervals as conditions permit, and local geographical monographs are to be compiled, which will, it is hoped, lead in time to the publication of a treatise on the geography of South Africa. Further, a geographical museum and library is to be established, and "floating exhibitions" are to be arranged for. Since

geographical education is to be one of the special interests of the Society, it is hoped to found travelling scholarships, while there are not only to be local excursions, but tours of a much more ambitious nature are also to be arranged for as soon as conditions permit.

The first issue of the *Journal* reflects great credit on all those concerned, and among articles dealing with South African problems we note especially a long paper on its Phyto-geography by Professor J. W. Bews of Natal, and one on Namaqualand by Dr. A. W. Rogers, the director of the Geological Survey and the president of the Society. The issue also contains a list of lectures to be delivered during the present year.

America.

The Juan Fernandez Islands.—Mr. Carl Skottsberg gives in the May issue of *The Geographical Review* a summary account of an expedition to these islands, undertaken during 1916-7, chiefly for the purpose of studying the very peculiar flora. The article contains some useful maps, and a large number of beautiful and striking illustrations, showing especially the characteristic plants.

The group consists of two larger islands, Mas-a-tierra, about 12 miles by $3\frac{2}{3}$, and Mas-afuera, 90 miles further west, which is 6 miles by $3\frac{1}{2}$. At the south-west end of Mas-a-tierra is the small and desolate islet of Santa Clara. Only Mas-a-tierra is at present inhabited, and contains a fishing community numbering about 300 persons. True fish of various kinds are numerous, but the fisheries are confined to a large lobster (*Palinurus frontalis*), which is much relished as food in Chile. There are two canning factories on the island, and live lobsters are also carried in large numbers to the mainland. Nearly all the fishermen have gardens in which they grow fruit and vegetables, and small herds of cattle graze in the well-watered valleys; but goats are now scarce.

All the islands are built of Tertiary volcanic rocks, and Mas-a-tierra has a very broken topography. The eastern part is the higher, and along its southern side the culminating point falls abruptly down to the sea 3100 feet below. The rain-bearing currents strike against the eastern heights, and forests here descend to the sea. The south-western part is drier, and forest is absent, the surface being covered with grasses and herbs. The climate is agreeable, the summer not being very hot and the winter mild.

Mas-a-fuera is very inaccessible, consisting of a solid rectangular block of lava descending to the sea in cliffs. A narrow strip of boulders along the beach permits access to the valleys, but the surf often makes landing impossible. The highest point of the island was found to be 5300 feet above sea-level. Forest is here confined to the middle part of the valley systems, forming an interrupted belt between 1000 and 2200 feet above sea-level. Above this line there is a foggy region where meadows and vast beds of ferns occur. Above 3500 feet the scenery becomes alpine, and there is a very remarkable Magellanic flora, of pure subantarctic character, quite unexpected in this latitude.

The flora of the whole group is very striking in its diversity. There

is first a Chilean element, as would naturally be expected, then there is the subantarctic element. Further, there is a small tropical flora, not related to the present flora of Chile. Finally, there is a highly peculiar endemic element.

Vital Statistics in the United States.—An interesting minor effect of war conditions in the States has been that the importance of accurately kept records of births and deaths has become increasingly apparent. It may be news to some here that the war should be necessary to rouse public opinion in regard to what may seem one of the primary duties of a civilised state. In point of fact, however, the keeping of such records is a recent phenomenon in the States and is still very far from universal.

A note in *Science* for June 14 gives some account of recent progress and of what still remains to be done. The area from which the Census Bureau annually collects and publishes death statistics now comprises twenty-seven states, forty-three cities in other states, the district of Columbia, and the territory of Hawaii. Within this area there reside about 75 per cent. of the total population of the continental United States and Hawaii. The annual collection by the Census Bureau of such statistics began in 1902, and the original registration area contained 40 per cent. of the total population of the country. Since 1906 the area involved has thus shown a rapid increase.

The birth registration area only includes at present nineteen states, and is estimated to contain about 51 per cent. of the total population of the country. The collection of these statistics was begun about two years ago, and the area dealt with then contained about 31 per cent. of the population.

Australasia.

The Active Volcanoes of New Zealand.—Mr. E. S. Moore contributes to *The Journal of Geology*, xxv. 8, an article on this subject which contains some striking illustrations, and contains a very full account of the great eruption of Tarawera in 1886. In North Island there are five active volcanoes: White Island, in the Bay of Plenty, which was active in the autumn of 1914; Tarawera, the great eruption of which destroyed the famous pink terraces; Ruapehu, which is in the solfateric stage, and almost extinct; Ngauruhoe and Tongariro, also in the solfateric stage, but still displaying explosive outbursts, those of Ngauruhoe being at times of considerable violence. All five seem to be closely related, being arranged almost in a direct line along the great Whakatane fault. Practically parallel to this fissured zone there is another belt containing numerous extinct or dormant volcanoes, and extending from the lofty Mount Egmont to the Auckland district. There seems also to be another line of disturbance connected with a great fault which runs through the north-central part of the island to Hauraki Gulf, passing the Waihi mining district. This great rift valley has helped to produce the lowland area which stretches from Hauraki Gulf towards the centre of the island.

The greatest period of volcanic activity seems to have opened in the Middle or Lower Miocene Period. The author believes that Lake Taupo and the other larger lakes of the central area are old craters modified by faulting.

The most remarkable feature of the great eruption of Mount Tarawera in June 1886 was the opening of a huge fissure, which began at the northern end of the mountain and extended southward. The chasm is about $8\frac{3}{4}$ miles long, $1\frac{1}{4}$ miles wide at the present Lake Rotomahana, which occupies the site of two small earlier lakes, and it penetrates 900 feet into the crust of the earth. During its formation it is estimated that from 520,000,000 to 620,000,000 cubic yards of material were thrown out, which was spread over an area of almost 6000 square miles. Even now there is very little vegetation on the mountain, but near Wairoa, where it was destroyed, or very severely damaged, the eucalyptus trees are already fourteen to fifteen inches in diameter, trees of less rapid growth eight inches, and the bracken fern has established itself, and flourishes well on the acid soil. Round Lake Rotomahana there is still much thermal activity, though the very remarkable Waimangu Geyser, which is placed a short distance from the lake, ceased to be active in 1908.

The author during his visit saw no evidence of glaciation in North Island save for the small glaciers on Ruapehu.

General.

Obituary—G. K. Gilbert.—We regret to record the death, which took place on 1st May last, of Dr. Grove Karl Gilbert, the American geologist and a corresponding member of the Society. Dr. Gilbert is perhaps best known for his very important monograph on the geology of the Henry Mountains, published so long ago as 1877. It was in connection with his work in this region that he employed the term laccolites, or "stone-cisterns," for the great cauldron-like masses of igneous rocks first described in the Henry Mountains, but subsequently identified in many other parts of the world. From 1879 onwards Dr. Gilbert was a member of the U.S. Geological Survey, and contributed to its publications a number of papers of great value, notably those containing his accounts of Lake Bonneville. So lately as 1914 he published a very important work on the transport of sediment by streams, which arose out of his early investigations in the Henry Mountains, and was based upon experimental work carried on in the laboratory of the University of California. This paper was abstracted here in vol. xxxi. p. 384. Dr. Gilbert was born in Rochester, N.Y., in 1843, and was thus in his seventy-fifth year at the time of his death.

The British Association.—The statutory meeting of the general committee of this body was held in London on 5th July, and at this meeting much disappointment was expressed that for the second year in succession it had been found impossible to arrange for an ordinary meeting. A resolution was passed unanimously asking the Council to

arrange for a meeting in London next year, if it should prove impossible to arrange to meet at Bournemouth. The question as to the type of meeting which it was desirable to hold was left to the Council to decide.

Economic Geography.

Alaskan Products in 1917.—A note in *Science* for June 7 gives some details, taken from *The Fisheries Service Bulletin*, in regard to the fisheries and fur trade of Alaska during the year 1917. The value of the fishery products reached a total of nearly 51½ million dollars, and of this amount no less than 93 per cent. was due to the salmon fisheries. The halibut fisheries come next, and yielded over one million dollars. The herring and cod fisheries each yielded products of the approximate value of three-quarters of a million dollars, while the whale fishery produced rather less. The total yield of the fisheries is stated to be unprecedented, and formed a notable addition to the world's food-supply. The fur trade is far less important, the total yield, including the produce of the Pribilof Islands, not reaching much more than one and a quarter million dollars.

NEW BOOKS.

AMERICA.

De Québec à Valparaiso. Par Henri Goy. Paris: Armand Colin, 1917. *Price 3 fr. 50 c.*

In August 1913 the author of this book left Havre for Quebec on an educational tour round the world, the funds being supplied by a grant from the Albert Kahn Trust. He spent three weeks in Canada, then made his way to the United States, where he visited New York, Philadelphia, Washington, and travelled west by Pittsburg and Chicago to San Francisco. From California he zigzagged across Arizona and Texas, making his way finally to New Orleans. From here he went to Cuba and some other of the West Indian Islands, paid a visit to the Panama Canal, and then travelled on through Brazil to the Argentine. After crossing the Andes and visiting Chile, he took a cargo boat from Valparaiso to the Sandwich Islands, caught at Honolulu the American mail-boat to Japan, and arrived at Yokohama on July 28, 1914, to be plunged at once into the fever of anxiety which reigned in those eventful days. On August 12 he again took the American mail-boat, but in the reverse direction, for the continuation of the tour was, of course, at once abandoned. From San Francisco he returned across the Atlantic to Europe, to be greeted, as he approached France, by a wireless message announcing the victory of the Marne.

The volume, as he tells us in his preface, is little more than certain pages from his travel note-book, for the war has rendered any working up of the material impossible. Since, however, the observations made in America bore especially upon educational methods in the different parts of the New World, and upon the extent of French influence there, the book has been published as a contribution to the work of reconstruction and readjustment in the France of the future.

It is divided into three sections. The first gives a description of the actual tour, which we have summarised rapidly above, and states the more general observations made. In the second are discussed in some detail the subjects to

which the author devoted special attention, the schools and their curricula in some of the regions visited being especially subjected to analysis and criticism. A short appendix gives an account of the hurried journey home from Japan, and the experiences met with *en route*. It is no reflection on the book proper to say that it is this last which will be read with most interest here, for it reflects, both in its style and in the brief descriptions of incidents of the journey, the author's emotions, shared in those summer days by so many thousands who were hurrying homeward to their mother countries from the ends of the earth! Like so many others of the Allies also, M. Goy found not a few candid persons eager to inform him that defeat was inevitable, and would occur in a very short space of time, and he does not disguise his heartache during his crossing of neutral America. According to him the attitude in the States at this stage might be briefly summed up in Mercutio's phrase, for the Americans "unanimously disapproved" of the war, and made little distinction among the belligerents, except that German propagandist literature was largely in evidence. It is not without interest to read that at a time when M. Goy still believed war impossible, he met in Yokohama a German correspondent of the *Cologne Gazette*, who stated that he *knew* that war was inevitable, and that Britain would join France and Russia.

But if one naturally turns to these last pages first, it must be added that the earlier ones give very fresh and interesting accounts of the new countries across the seas, the problems with which they are confronted, and the ways in which they are striving to solve these.

In the Alaskan Wilderness. By GEORGE BYRON GORDON, Sc.D., F.R.G.S. Philadelphia: The John C. Winston Co., 1917. Illustrations and Maps. *Price* $3·50 *net.*

This is a popularly written and easily readable account of a canoe voyage in 1907 across Alaska by way of the Kuskokwim River made by the author and his brother, Lieutenant MacLaren Gordon. It does not profess to be more than a reconnaissance of a little known and almost uninhabited region, with a few aboriginal tribes of Indians and Esquimaux. The route across Alaska from the Tanana River, a tributary of the Yukon, eastwards to the Behring Sea, had for the most part never been explored by white men, and only a few trappers and prospectors had ventured into the vast tundras through which these rivers wend their tortuous way. The author gives a map of his wanderings, but as he says he had no surveying instruments, this must be regarded as more or less of an elementary sketch. One interesting feature of the journey across the vast flat and dismal expanse of swamps and forest was the sight of the grand peak of Denali, which is also known as Mount M'Kinley, and is said to be the highest mountain in North America. The winter—very properly it seems to an outsider—objects strongly to the ordinary American designation of this magnificent landmark comparatively recently named after a politician whose only claim to fame or notoriety was the imposition of a highly protective tariff for the benefit of certain financial interests. There appears to him no sense of fitness to reconcile one to the association of ex-President M'Kinley with a natural feature of the Alaskan landscape. The Indians call this, the grandest and most majestic of their mountains, *Denali* or *Most High*, and we heartily agree with the author when he says: "There are many people who prefer the practice that has given us such names as Manitoba, Mississippi, Oregon, Tacoma, Popocatepetl, and Chimborazo. For their sake I am going to persist in using the name *Denali*, like the savages who have some priority in the matter and who have their own fancy for names." It is to be hoped that these very sound views will find the acceptance they deserve among

geographers, and that Denali will become the universally accepted designation of this splendid mountain.

These Alaskan rivers during the summer are infested with mosquitoes, which make life almost intolerable, and to judge by the account of the voyage the region is as a whole singularly unattractive, and seems to be almost uninhabited by men or animals.

The writer has much to say of the natives whom he met nearer the coast, most of them in their primitive state. Sad to relate, a large number of the original inhabitants appear to have perished from diseases due to the first visits of white men. Smallpox, pneumonia, and measles, unknown in former times, have carried off whole communities, and he passed various huts full of the bones of their pest-stricken inmates. Many photographs of the types of humanity are given, and some account of their language and repulsive habits form the appendix to an interesting volume.

AUSTRALASIA.

Tropic Days. By E. J. Banfield. London: T. Fisher Unwin, 1918. *Price* 16*s. net.*

The author of *The Confessions of a Beachcomber* has long since won his spurs in the public esteem, and needs no introduction to the reader who takes up this, his latest book, which he has dedicated to "Brother Beachcombers, professing, practising." It follows on similar lines to his *My Tropic Isle*, reviewed in this *Magazine* about six years ago (*S.G.M.*, vol. xxviii. p. 220). Again it treats of an island off the coast of North Queensland, and contains a gallery of scenes taken from that part of the South Pacific which lies inside of the Great Barrier Reef. Mr. Banfield possesses great charm of style, as well as the knack of describing in interesting and attractive fashion what he has seen and experienced of the lives of plants and animals, of marine creatures, and also of the fast vanishing Queensland natives. The story of Soosie—"the black girl with a white girl's heart"—who had been brought up with an English family and taught as one of themselves, but yet was claimed as his wife by a dirty, repulsive, old blackfellow relation; and, finally, when she ran from her home to escape his attentions, was tracked, killed, and eaten by the members of her tribe, is tragic in the extreme.

Mr. Banfield passes "from grave to gay, from lively to severe," and the episode of the Chinaman, in the paper called "Passeth all Understanding," is inimitable in its way. The author is a firm believer in the theory of a future evolution of a North Australian type of European, a sun-loving race, who may even become permanently embrowned by exposure and the liberal application of coco-nut oil. "The type will be that which is best able to maintain itself. It will be brown of complexion, hardy, and alert." Who can say but that it may have need of all the qualities which will enable it to survive in future struggles for a place in the sun?

The chapter on Pearls provides some fascinating reading, and we have reason to feel grateful to Mr. Banfield for a book which helps to carry one away from the atmosphere of war. It contains some fine illustrations from photographs, and, we feel sure, will be warmly welcomed by many readers.

GENERAL.

From Bapaume to Passchendaele, 1917. By Philip Gibbs. With Maps. London: Wm. Heinemann, 1918. *Price* 6*s. net.*

This is a collection of reports by the well-known war correspondent, Mr. Philip Gibbs, written for the *Daily Chronicle* and other newspapers, describing the inci-

dents of the fighting during last year which resulted in the retreat of the Germans from the Somme, the great battles in front of Arras, and the taking of the Vimy Ridge, the destruction of the Messines Ridge, and the battles in Flanders leading up to the capture of Passchendaele. The book is hardly geographical, but it is of absorbing interest, and is illustrated by an admirable series of orographical maps.

The picture given of the titanic struggle is a fine piece of realistic writing which makes an appeal to the reader through every sense, and enables the mind to realise "the beauty and the ugliness and the agony of it, the colour and the smell and the movement of it." Yet, at the end, though the writer dwells with sympathetic persistence on the human detail of the fighting," it seems impersonal and inhuman, like some cosmic struggle in which man is but an atom of the world's convulsion." Yet some outstanding aspects of the year of battles remain with the reader. One is the stubborn courage of all ranks. This stands out clearly on every page, and the bravery of the "boys of the 8/10th Gordons," who made their way through the British barrage to get at some Germans who were running away on the other side of our wall of shells, is only one of many similar tales of death-defying valour. The account Mr. Gibbs gives of the reverse at Lombartzyde, where the King's Royal Rifles and the Northamptons of the 1st Division, "against overwhelming odds and under annihilating fire, held their ground until there was no ground but only a zone of bloody wreckage," is a tribute, fittingly told, to one of the glorious deeds of last year.

Strange, humorous, and sometimes ironical incidents gleam through the pages, but the note of tragedy is over all—how can it be otherwise? So impressed is Mr. Gibbs with this that in one section—"On the Trail of the Enemy,"—he describes in burning words the hideous destruction of houses and their belongings, "so that a cheap-jack would not give fourpence for anything left in Péronne, and worse still, the ruin of women and children and living flesh." He only records; he cannot explain. "It is difficult to find any clue to the character of these German soldiers, who have left behind them proofs of wonderful labour and skill, and proofs of great sentiment and religious piety, and proofs of an ordered cruelty worse than anything seen in France since barbarous days."

A War-Time Voyage: Being the Itinerary of an Ocean-Tramp from Port to Port, 1916-17. By J. E. Paterson. 1918. London and Toronto: J. M. Dent and Sons, Limited; New York: E. P. Dutton and Co. *Price* 6*s. net.*

Tramps, it may not be unnecessary to explain, are trading merchant vessels other than regular liners. To an honorary purser, seeking health from his voyage, and possessing the knack of striking off a "newspaper article" as suggestions come to him, the freedom of the tramp was, of course, an advantage. The voyaging of this tramp was from London to Philadelphia, back to Gibraltar, thence to various Mediterranean ports, out again into the Atlantic and down south to Monte Video, thence home. But in this volume the itinerary is a very subordinate matter. The subject-matter is first of all the various events—of no great importance, any of them—that diversified life-on-board, including the author's talks with the master; secondly, accounts of people met on shore, in restaurants, places of amusement, etc. Danger from U boats gives an extra fillip to the interest at intervals. Perhaps one should be lenient with what was written on board ship, but several mangled and misapplied quotations and obviously mixed metaphors try the patience in "war-time."

Map of South-west Scotland

The Edinburgh Geographical Institute

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE RIVERS OF SOUTH-WEST SCOTLAND.

By Frederick Mort, D.Sc., M.A., F.G.S., F.R.S.G.S.

(With Maps.)

Area discussed.—The area discussed in the present paper comprises southern Ayrshire, Wigtownshire, Kirkcudbrightshire, and western Dumfriesshire. It is easier, however, and more accurate, to delimit the area by physical rather than by political boundaries. It may be described as the part of the Southern Uplands that lies west of the river Nith.

River Problems.—The whole of this district bristles with curious and puzzling problems in river-development. The Southern Uplands are trenched right through from north-west to south-east by furrows that seem providentially planned for road and railway routes. The rivers flow from hilly areas to the lowlands, and then, changing their minds, reverse their courses and attack the uplands again. There are glens of considerable size either perfectly dry or containing little trickling streams quite out of proportion to the valleys in which they flow. The head-waters of two rivers may take their origin almost on the same spot, and for no very apparent reason flow in opposite directions from a watershed that seems merely an arbitrary point in a long continuous depression. These and other perplexing problems, however, are not confined to this area. They challenge the investigator everywhere in Scotland, and detailed examination shows that the phenomena can be explained on principles that are in harmony with the interpretation of the general river system of Scotland due to Cadell, Peach and Horne,[1] Mackinder, and other pioneers.

Original Surface of Land.—In early Tertiary times the surface of Scotland formed an undulating plateau, and on this plateau originated the streams that initiated the present river system of Scotland. Traces of the plateau can still be detected about 3000 feet above the present

[1] One of the most masterly and suggestive memoirs on the evolution of the surface features of Scotland is Peach and Horne's contribution to vol. i. of the *Bathymetrical Survey of the Fresh Water Lochs of Scotland*. Several points in this article were suggested by that memoir.

sea-level. The tableland extended westwards considerably beyond the coastline of to-day, and it had a gentle tilt towards the south-east. The original consequent rivers of Scotland therefore flow from north-west to south-east. As regards the area specially considered in this paper, it is important to remember that the tableland stretched without a break from the Highlands across the present Southern Uplands. The later development of the Central Plain into a lowland area between two hill regions profoundly modified the whole river system of the Southern Uplands.

Time of Origin of Rivers.—We know approximately when the rivers of Scotland began to etch out their valleys from the original tableland mainly from a consideration of the innumerable volcanic dykes that cross the country in certain dominant directions The chief dyke system is referred by geologists to early Tertiary times. Some of these dykes can be traced on the present surface of the land up-hill and down-dale, running far up on the shoulder of a mountain such as Ben Lomond, and then disappearing below the waters of Loch Lomond. If the valleys of to-day had existed when these dykes were intruded we should now find them filled with lava. The present rivers were therefore not in existence at the beginning of the Tertiary epoch. In Miocene times, however, we know that the consequent rivers drained into a sea comparable with the present North Sea. It stretched at least from France to the mouth of the Baltic. It should be remembered that at this time the land stood more than 200 feet higher above sea-level than it does now.

Nature of Rocks.—Let us turn now to a more detailed study of the area under consideration. The rocks are almost entirely of Silurian age, and comprise flaggy sandstones, conglomerates, limestones, cherts, mud-stones, and volcanic rocks. They are often strongly folded, and their original nature is sometimes altered and obscured. These rocks are penetrated by three large granite masses, the most southerly boss stretching almost from the Nith to the Dee, near the shores of Solway, the central boss between New Galloway and Newton-Stewart, and the most northerly extending southwards for twelve miles from Loch Doon among the wildest and most desolate part of Scotland outside the Highlands.

Relief.—Parts of the area rise into hills of considerable height. The summit of the Merrick is 2764 feet above the sea, the highest point in Scotland south of the Highland line. The scenery of the adjoining district is stern and rugged to a degree not met elsewhere in the Southern Uplands. Loch Macaterick, Loch Enoch, the Dungeon Lochs, Loch Neldricken, Loch Trool—romantic names—lie in one of the wildest and loneliest parts of Scotland. Cairnsmore of Carsphairn (2612 feet) is the highest point of a small granite mass east of Loch Doon, Cairnsmore of Fleet (2331 feet) is the chief summit of the central granite boss, and Criffel (1866 feet) is the best known hill of the southern granite area.

The Merrick District.—The highest summits of the Merrick district are not found in the granite, but form an elliptical ring immediately surrounding the igneous rock. Fig. 1 illustrates this interesting point

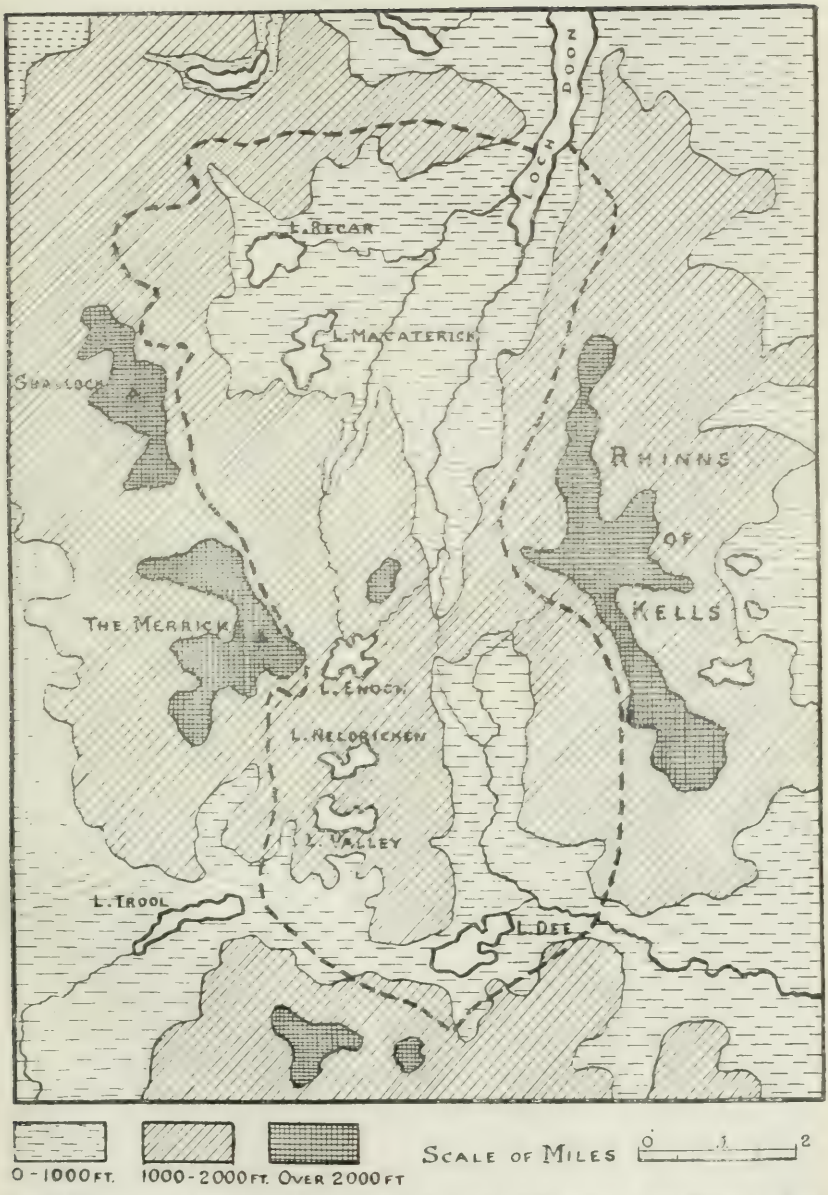

Fig. 1. —The rim of high ground surrounding the Loch Doon granite. The boundary of the granite is shown by a thick broken line.

quite clearly. The boundary of the Loch Doon granite is shown by a heavy broken line. The highest summits are found west of the granite in a long rugged ridge, the culminating points of which are Shalloch on Minnoch and the Merrick. On the east the granite is bounded by the range called the Rhinns of Kells. The southern part of the ring is indicated by the two areas of ground more than 2000 feet above sea-level. Northwards, too, the rim of high ground is indicated clearly on Fig. 1, although here it falls below 2000 feet. The Silurian rocks surrounding the granite have been so hardened and indurated by the intrusion of the igneous mass that they resist weathering more successfully than any other part of the Southern Uplands, and therefore present the loftiest hills of all southern Scotland.

Consequent Rivers.—The principal consequent rivers of south-west Scotland are the Nith, the Ken-Dee, and the Cree. Each one of them occupies a valley that trenches completely through the Southern Uplands. It is quite clear that in former times they rose far to the north-west of their present sources, but that the formation of the Central Lowlands beheaded them and diverted part of their waters northwards. It seems quite probable, too, that before the formation of the Solway Firth they extended much farther to the south-east. A subsequent stream, however, tributary to a trunk river that flowed down the present North Channel, worked eastwards along the line of the Solway Firth, and diverted the consequents to the south-west. These rivers have thus (to use rather an Irish expression) been beheaded at both ends.

A Vanished River.—The three most prominent bays of the northern shores of the Solway are Kirkcudbright Bay, Wigtown Bay, and Luce Bay. They increase in size as we pass westwards down the firth. Kirkcudbright Bay is the estuary of the Dee, Wigtown Bay is the estuary of the Cree, but Luce Bay, the largest, is not the estuary of any river. A glance at the accompanying map shows how significantly Loch Ryan is situated with regard to Luce Bay. One can hardly resist the conclusion that Luce Bay, Loch Ryan, and the depression between them mark the course of an extinct consequent river of considerable size. Although the present depression was eroded since early Tertiary times, there is evidence to show that the Tertiary river was merely re-excavating along the line of a very old valley. Patches of Carboniferous rocks among the older Silurian strata indicate the course of a pre-Carboniferous valley.

Subsidence of Land.—The increasing size of the bays as we pass westwards is connected with the decreasing height of the summit levels between the Solway and the Firth of Clyde. Starting from the Solway at Kirkcudbright Bay and ascending the Dee, we should cross to Loch Doon, and thence by the river Doon to the Firth of Clyde, the highest point reached being just under 750 feet. The route from Wigtown Bay by the Cree valley need never attain 500 feet above sea-level. We can pass from Luce Bay to Loch Ryan without crossing the 100-feet contour-line. These facts indicate a subsidence of the land that was greater on the west than in the east.

The Cree.—Let us consider next the main consequent rivers of the

area, beginning in the south-west. The main road from Newton-Stewart to Girvan uses the valley of an old consequent river, the degenerate descendant of which is the present Cree. The old valley is identical with the present Cree valley as far as Bargrennan. Thence we turn west to the low ground about Loch Maberry and Loch Dornal, and then north-west to Barrhill, following the line of the old main road from Newton-Stewart to Barrhill. We have now crossed the watershed and are passing down a valley (the Duisk) draining to the Firth of Clyde. This part of the old consequent Cree system was beheaded by the subsequent river Stinchar, and the Duisk is the obsequent stream thrust by the river Stinchar along the valley it had captured. We shall see later how the beheader was itself beheaded.

The Ken-Dee.—The main road from Kirkcudbright and Castle Douglas to Ayr uses the valley of the old consequent river represented to-day by the Dee-Ken system. This valley, like the others, trenches right through the Southern Uplands. Its course is marked by the following towns or villages:—Kirkcudbright, New Galloway, Carsphairn, Dalmellington, Ayr. North of Carsphairn the old valley kept west of the road. The northern part of Loch Doon, where the loch runs north-west and south-east, probably marks the old consequent valley. Loch Doon drains northwards by the river Doon through the fine canyon of Ness Glen. This seems to the present writer to be clearly a post-glacial feature. There are indications of the old valley slightly to the east. During the Ice Age the pre-glacial valley was blocked, and the waters of Loch Doon, escaping by a new route, soon ripped out the long, straight chasm of Ness Glen. Near the mouth of the glen the old valley is reached again. Like the Duisk, the Doon is an obsequent river occupying the old consequent valley. It originated when the formation of the Central Lowlands robbed the Southern Uplands of their headwaters.

The Nith.—The Nith is the best known of all the rivers of south-west Scotland, not only from the beauty of its scenery, but because its valley is utilised by the Glasgow and South-Western main railway line as the most convenient route through the Southern Uplands. The Nith rises in a little, boggy amphitheatre among the Ayrshire hills. In the same marsh rises one of the head streams of the Water of Deugh, which flows southwards past Carsphairn to join the Ken. The sources of British rivers as a rule are not impressive, and the Nith is not exceptional. The watershed is situated in a little valley, but not in what one would call a marked "through valley." This part of the river is, of course, of comparatively recent date. For a few miles the river is obsequent. Then it turns north-east in a subsequent valley that may once have been a tributary of the original river. At New Cumnock the Nith reaches the old consequent valley, and follows it thereafter to the Solway. The comparatively rapid erosion of the Central Lowlands has destroyed all traces of the former valley that once stretched north-westwards from New Cumnock. Like the depression between Luce Bay and Loch Ryan the Nith marks the course of a very ancient valley. Patches of Carboniferous rock indicate a pre-Carboniferous hollow

which many ages later in Tertiary times was re-excavated by the Nith.

The Stinchar.—The Stinchar is a subsequent stream which by working along the strike of the rocks developed into a considerable river. We have already seen how it captured part of the headwaters of the Cree. The most interesting part of the Stinchar's course is shown in Fig. 2. If the river is traced up stream it is seen to leave its large subsequent valley about three miles from its source, and to descend from the hills in a direction at right angles to its former course, and in a much smaller valley. The sudden change in the size of the valley is very significant. It is important also to note that the young Stinchar enters the larger

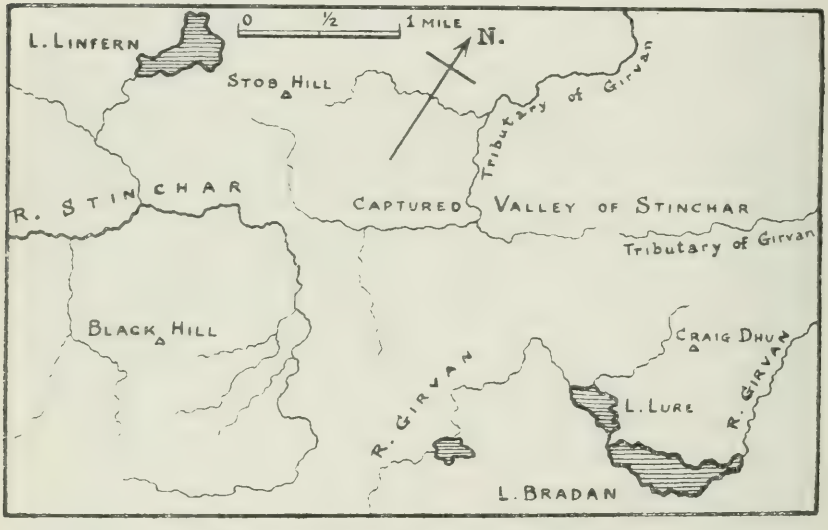

Fig. 2—The headwaters of the Stinchar and the Girvan.

valley over rapids terminating in a small waterfall about twelve feet high. The sudden discordance in the grading of the stream at the right-angled bend makes one suspect some unusual feature. The large subsequent valley, however, does not stop, but continues for a short distance as a dry hollow, and is then occupied by a small tributary of the Girvan. It is a striking and obvious case of river-capture. A considerable part of the course of the Girvan lies in the soft rocks of the Lowlands, and it has therefore worked to base-level more rapidly than the Stinchar, and thus has been able to capture the headwaters of the latter stream.

Piracy by the Doon.—But the former subsequent valley of the Stinchar can be traced beyond the Girvan. It seems to extend to the north-east at least as far as the Doon. The indications point to the conclusion that the Girvan, after beheading the Stinchar, was itself beheaded by the Doon. The sequence of events appears to have been as follows.

The Stinchar established itself in a long subsequent valley stretching north-east beyond the present Doon. As explained above, the former river was beheaded by the Girvan. Then the obsequent Doon established itself along the line of the former Dee-Ken, and, partly because its valley was already excavated, partly because it was working entirely in soft Lowland rocks, it base-levelled more rapidly than the Girvan, and so was enabled to capture the headwaters of the latter river. Much of the granite area south of Loch Doon has been attacked vigorously by the head-streams of the river Doon, so that it forms a kind of basin surrounded by high hills of indurated Silurian sediments. (See Fig. 1.)

The Boundary Fault.—In considering the upper valley of the Stinchar, one may be misled by a factor that introduces a complication into the interpretation of the phenomena. Part of this valley coincides very closely with a strong fault that for a considerable distance separates the Lowlands from the Southern Uplands. Is it possible that we are attributing to the Stinchar a depression that is really a fault valley, and was merely occupied (but not eroded) by the Stinchar, the Girvan, and the Doon? Three arguments militate against this conclusion. The fault-line does not coincide exactly with the long subsequent valley. In various localities (north of the Nick of the Balloch, near the source of the Nith, etc.) the fault-line crosses ridges without making any prominent feature on the hill-side. The subsequent valley is in places sinuous, and presents all the appearances of having been water-cut. Doubtless the existence of a line weakened by faulting aided the Stinchar to establish its valley, but on the whole the long strike valley described seems to have been eroded by the Stinchar before its headwaters were captured by the Girvan and the Doon.

Ice Work.—After most of the river-work described in the previous pages had been completed, the district was covered by an ice-cap, and some features of the present drainage system are certainly due to ice action. The Loch Doon granite area surrounded by high hills formed a great collecting basin from which poured radially outwards powerful streams of ice. The shores of Loch Doon offer classic examples of ice-moulding. The numerous lakes of the Merrick district are mainly rock basins, some of the plateau basin type, some of the valley basin type.

The ice issuing from the great basin south of Loch Doon probably cut down some of the gaps in the hills that are difficult to correlate with any present or past system of water drainage. A good example of these gaps is the Nick of the Balloch. This is a cleft in the hills six miles north-west of the Merrick, which is used by the road from Ayr to Newton-Stewart *via* Crosshill. The divide between the Stinchar and the Water of Minnoch at this point is a broad saddle that may quite probably represent a consequent valley beheaded by the Stinchar. But the western side of this saddle is deeply "nicked" (hence the name Nick of the Balloch) by the ice stream that pressed through it from the Loch Doon granite basin lying to the south-east. A mile to the north-west also Glengap Hill has its north-western boundary ridge notched as if by ice coming from the same cauldron. This cleft presents exactly the

same appearance as the curious depressions in some of the high ridges of North Arran, which have been explained by the present writer in the same way.

Extinct Rivers.—If in imagination we were to attempt a reconstruction of the courses of the old consequent rivers before the formation of the Central Lowlands cut off so much of their drainage area, we should look for their head-waters somewhere in the Western Highlands. (See Fig. 3.) The reconstructed course of the Nith sets us speculating on

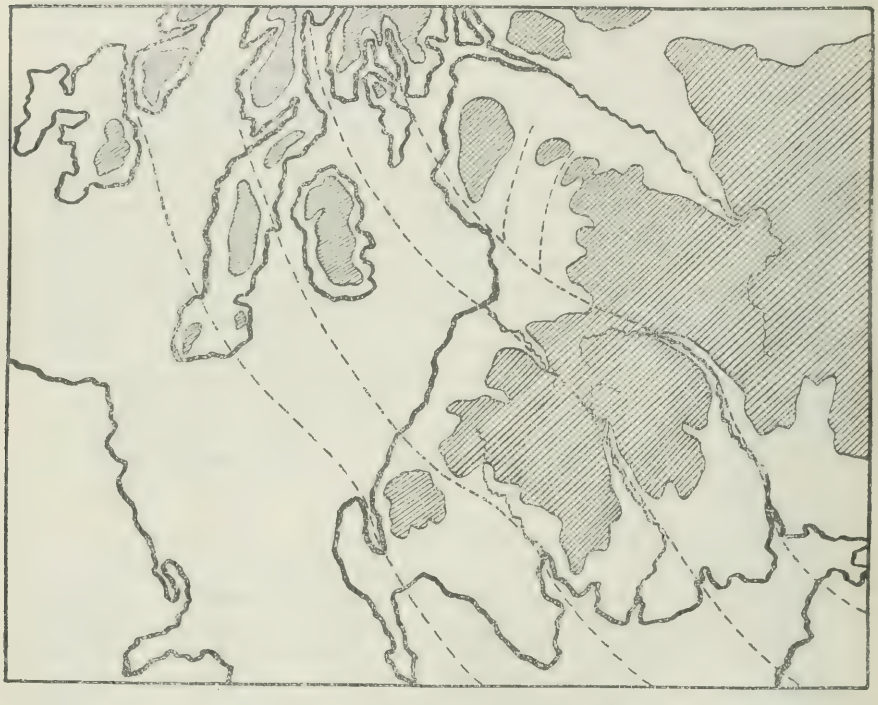

Fig. 3.—Reconstruction of the former courses of the rivers of South-west Scotland. The shaded areas represent land more than 600 feet above sea-level.

the origin of those two very important routes from Glasgow through the hills to the Ayrshire Plain—the Paisley or Lochwinnoch Gap, and the Barrhead or Loch Libo Gap. Are they relics of subsequent valleys tributary to the old consequent Nith? Can the deep cleft across North Arran from Loch Ranza to Sannox Bay be considered as a "fossil" tributary of the former Ken-Dee? Were some of the low valleys cutting right across the peninsula of Kintyre initiated by parents of the present Southern Upland rivers? Can the Sound of Islay even be referred to some extinct river that once crossed the Solway Firth? These are pure speculations, but they give interest to the ever-fascinating occupation of map interpretation.

NORTHERN PALESTINE AND THE LEBANON REGION.[1]

By M. H. Braid.

(With Illustrations.)

Mount Carmel to Nazareth.—The seaport town of Haifa is about fifty miles north of Jaffa, and is equally unsheltered and difficult as a landing-place. Before the war it was a compact, clean-looking town, occupied chiefly by German colonists, belonging to the sect of the Templars. A long gentle slope leads from the town to the top of Mount Carmel, and a wide sandy beach extends from the foot of the mountain round the Bay of Acre to the north. The broken wall and ruined aqueduct of the ancient fortified city of Acre testify to the persistent efforts of Crusaders —Baldwin, Richard, Saladin, and latterly Napoleon—to hold this "key of Palestine."

On the top of Mount Carmel there is a French Carmelite convent which claims to have been founded by St. Louis during his short crusading sojourn in Palestine. It has given its name to the monastic order of Carmelites, which is now spread over Europe.

There is a wonderful view from the top of Carmel: on the one side it extends far over the western sea, and on the other, eastwards over the plain of Esdraelon towards the land of Gilead. It was on the lower slope of Carmel, towards the sea, that Laurence Oliphant, in 1880, tried to carry out a project for the gradual restoration of the Jews to their own land. They were to form a self-governing colony, agricultural and pastoral, protected by the Turkish Government, and financed by the rich Jews of London, Paris, and Berlin.

The Turks did not continue to support the scheme: the Jews themselves did not take very kindly to it: so within a dozen years or so it fell asunder, and now the farm buildings may be seen along the hillside—in the midst of what might be fruitful fields—falling into ruin. One wonders whether the similar project now under discussion for the restoration of Israel will meet with any better success.

In the wide valley below the mountain the clear stream of the Kishon winds its way to the Bay of Acre and so to the Mediterranean. The verdure and beauty of the vegetation spreading over the long ridge of Carmel make it like a great garden or ornamental park (the name signifies a park), and the odours from the countless varieties of acacia, tamarisk, ilex, and many other scented shrubs, rise like sweet incense on the evening air.

A few hours by road (in a native carriage with miserable springs) brought us to Nazareth. The first few miles of the way lie alongside the stream of the Kishon. To the north-east rises the smoothly rounded mass of Mount Tabor, clothed with vegetation to the summit.

[1] This article is based on a visit made some years before the war.

In the nearer distance Little Hermon is seen, just as bare and rugged as Tabor and Carmel are luxuriant.

From the earliest ages this wide plain has been the meeting-place of contending nations. At its south-east extremity near Gilboa, on the plain of Megiddo, Saul and his armies were finally defeated, the day after the unlawful visit to the sorceress of Endor. In the later days of the monarchy, Josiah attempted to oppose Pharaoh-Necho on his march into Assyria, but "the Egyptian archers shot at Josiah and he was wounded," and he was carried to Jerusalem to die. From this time onward the struggle between East and West has been renewed at intervals. Greeks, Romans, Saracens, Crusaders, and in later days Napoleon, all have struggled here for the ascendancy; and now the Allied Armies are pressing forward in that direction, towards and beyond "Megiddo—which is called in the Hebrew tongue Armageddon."

By this route to Nazareth we pass both Nain and Cana of Galilee. The former lies on the slope of Little Hermon, but there is nothing by which one can recognise the town, except some straggling ruins on the hillside and the survival of the name. Cana is also a ruin, but not quite so deserted as Nain. The name denotes "reedy," and to this day the plain above which the town is situated is a wide marsh overgrown with reeds.

A few miles farther a sudden bend of the road brings us to Nazareth. I do not suppose a single stone remains of the town as it was in the time of Christ. The modern town is spread over the hillside at the upper end of the valley surrounded by a circle of green flowery hills—unlike most of the hill ranges one sees in Galilee. The most conspicuous buildings are the Franciscan "Convent of the Annunciation," and the Girls' Orphanage and School (of the Church Missionary Society), so ably conducted by Miss Newey. After the outbreak of the war the missionaries were obliged to leave Palestine, and the girls had to seek shelter where best they could find it. If little or nothing remains of the original town, at least we know that material nature is much the same as it was two thousand years ago. The hillsides and winding footpaths, the blue skies overhead, star-spangled by night, the highway which connects this retired village with the world outside—for it is the trade route to Jerusalem, to Damascus, to Rome; all these remain as they were then. Peace and quiet seemed to brood over the valley when we saw it, and one saw everywhere the evidences of the daily life and occupations of the folk. The copious perennial spring near the middle of the town, and known as the Virgin's Fountain, is the principal, if not the only source in the town. It is a "river of living water" springing from the limestone rock. The place of the well is walled in and covered with a vaulted roof, and morning and evening one sees the women gathered round the trough, in which the water collects, filling their jars and carrying them away on the shoulder in the usual graceful Eastern fashion.

The snow-capped crest of Mount Hermon, and the less imposing mass of Mount Tabor, are both visible from the hill behind Nazareth.

Beirut and the Lebanon.—We travelled from Haifa to Beirut by sea,

arriving soon after sunrise, and thus had our first impressive view of the Lebanon range, as its valleys and snow-covered ridges were lighted up by the morning sun. It was a memorable sight, and one which we were to have uninterrupted leisure to contemplate during the next few days. A suspected case of plague had occurred among the crew, and we had to remain in quarantine on board the steamer, or go into the lazaretto on shore. Of course we preferred the ship: it was anchored well out to sea, within reach of the fresh breezes, and commanding a glorious view of the wonderful panorama.

At the base of the mountain, along the coast, lies Beirut (the ancient Berytus), which looked much more picturesque at this distance than on a near acquaintance. The remains of the Phœnician cities of Tyre and Sidon are not far from Beirut. Broken columns, great stones, and fragments of masonry which have formed the mole, are seen under the sea at Tyre, and the shell-fish (*Murex*), producing the Tyrian purple dye, may still be found on the shore—we picked up several of them.

The plain of Phœnicia is a well-watered land. The Litany (Leontes), one of the large rivers which rise on the Lebanon, finds its way to the sea here. It has made a descent of four thousand feet in its course, and tears along its valley like a raging, boiling flood. The line of the old military road lay along the plain here, and at the opening of the valley of the Kelb (Dog) river, the cliffs on its rocky sides have been used for the purpose of recording the achievements of the "conquering heroes" of successive ages who have passed this way on their march to conquest or attempted conquest. On the first tablet is a full-sized figure of Esarhaddon, the Assyrian conqueror of Egypt. The legend records in cuneiform characters that he passed this way 672 B.C. A little way from this is another slab recording that here Rameses II.—*i.e.* the Pharaoh of the Hebrew Exodus—passed this way on his warfare against the Hittites. Beyond this is another tablet with a sculptured portrait of Sennacherib, to commemorate his invasion of Israel, 702 B.C., which, however, ended disastrously for him. There are several other slabs in the neighbourhood bearing historical records of the Assyrian monarchy, more or less decipherable to experts. Beyond extends the Anti-Lebanon range, of which the snow-crested mass of Mount Hermon forms the south-eastern termination. It is supposed to have been the Mount of the Transfiguration, and is grand and impressive from every point.

We did not linger long in Beirut after our release (except to visit the Girls' Orphanage and the Jewish Mission School for Boys), but made our way into the mountains, where we had planned to stay for some weeks. There are—or rather were before the war—so many pleasant places where one can find accommodation to spend a summer holiday in one or other of the villages perched in sheltered upland valleys. People come up from Beirut and Sidon and other places on the coast, also from Egypt and Alexandria, for the sake of the mountain breezes. Our destination was Ain-Sofar, on the summit level of the caravan route from the coast to Damascus, alongside of which the new railway extends. The railway journey took about three hours; it is a steep ascent all the way,

and commands wonderful views of sea and land. As it was high noon the mountain-tops were cloudless, and stood out in bold relief against the clearest of blue skies. Patches of heather, with here and there a clump of fir-trees, reminded one of the Scottish hills.

We tried a Syrian pension at first, but a few days sufficed; the food was good enough, but too markedly Oriental. Goat's flesh roasted or stewed with rice and pine seeds, native bread, and "lappert" milk, were the principal items, so we removed to the French pension farther up the hill, where the dietary was more varied, and settled down for a few weeks' stay.

There was a strong French element in the Lebanon district long before the war. Many of the better-class Syrian merchants had traded and done business with Marseilles and other French centres, and now the French language and tastes have been acquired by many of the natives; their sons and daughters have been educated in French schools, and come back quasi-Parisian. Others again had settled in Manchester and Liverpool for trading purposes, and so acquired a certain amount of English "culture." Many and varied were the incongruities of taste and manners we were witnesses of during the weeks of our stay in that French pension. In the morning we encountered the Syrian ladies in the favourite Syrian *déshabille*—a more or less dilapidated *peignoir*. In the evening the same ladies appeared in most elaborate evening dresses, direct from Paris, hands and arms and neck laden with jewellery; so much so, that we used to wonder if they had inherited something of the Phœnician love of precious metals and stones. They were fond of parading outside in the warm summer nights, smoking endless cigarettes. I have seen one of the older ladies come inside, settle herself on the divan, cross-legged as often as not, beckon to the native servant, who straightway brought the hookah—"hubble bubble pipe"—ready lighted, which she continued to whiff with evident satisfaction for the rest of the evening. The husbands meanwhile seek their distraction in the Casino, where, we were told, gambling went on *ad libitum*.

It was good to escape from it all and make one's way out to the roof-balconies, where there was a magnificent view of the valley east and west. Opposite towered Mount Sanin, one of the highest peaks of the range, with a fairly large glacier clinging to its side; further east rises the ever-beautiful Mount Hermon, its snow crown glittering against the perfectly clear, starlit sky, and northwards the main *massif* of the Lebanon stretches in an unbroken chain far as the eye can reach, the higher ranges entirely snow-clad. At this altitude the nearer peaks lose in height, as Ain-Sofar (the Spring of the Rock) is about four thousand feet above sea-level. It is not one but many springs we see welling up from the rocks here, and at first one supposes that it is from this source that the vine-terraces on the hillsides derive their moisture. But it is not so; the real source of moisture for the varied and abundant fruit orchards of the region is the mist borne inwards by the sea-wind which blows every night from the west during summer. There is practically no rain from May till October, the ground becomes dry and

cracked, and yet no finer fruit crops are to be seen anywhere. I have seen grapes weighed by the hundredweight as coal is here, and the apples, peaches, figs, and pomegranates of Coele-Syria are beyond compare.

At night the perfectly clear sky allows the day's heat to radiate very rapidly, so that at sunrise the valleys are filled with a thick, heavy, white mist, which boils and whirls and tumbles about until the heat of a new day dispels it again. As this goes on day in and day out during the whole summer, the weather is far more reliable than in the Swiss Alps, where the morning mists so often give way to rain at noon. I have tested the humidity of the night air by leaving some woollen material on the balcony over night, and in the morning I could have wrung the moisture from it like Gideon's fleece. Much of the imagery of the Old Testament is based upon this vivifying influence of the "early dew."

Another important industry in these valleys is the raising of the silkworm and the manufacture of raw silk. As in Piedmont and the south of France, the villagers mostly keep the silkworms in sheds fitted with shelves divided into pigeon-holes. As soon as the caterpillar has emerged from the egg the pigeon-holes are kept constantly and abundantly supplied with mulberry leaves, and nothing connected with the work is more surprising than the rate at which the young worms eat and grow. At the end of eighteen days or so they are about three inches long. The caterpillar, which has renewed its skin three or four times in this interval, then draws itself together, to about one third of its length, which increases the thickness of the body. It remains in a state of torpor for a short time, and then begins to spin its cocoon or winding sheet by withdrawing from its body the gummy fibre it has prepared. It goes on winding this substance round and round its body in one continuous thread till it has exhausted its material. This is the critical moment, when the watchers must keep a very strict guard to see that the insect now developed inside the cocoon is not allowed to bite its way through its winding-sheet, and emerge into the light of day as a silk moth. If it does this the silk is useless, as the fibre cannot be unwound. But the girls are well trained, and very skilful in seizing the cocoon at the right moment and plunging it into a bath before the moth can take wing.

The process of unwinding the silk is a very delicate one also. It is done in a long room fitted with tables down the centre, into which are fixed porcelain basins, each worker having her own water-tap and gas-burner. The silk is kept moistened while it is carefully drawn from the cocoon and wound into hanks on a simple machine. The raw Syrian silk is of a beautiful yellow colour, and after it is wound the hanks are hung from lines in the store-room, looking like spun gold, and find their way ultimately to the looms of Damascus and Persia, sometimes to Lyons and Paris, though these markets are more often supplied from Piedmont. Of course some of the insects must be allowed to take wing to secure the next season's crop. The moth is a pretty creature, has two pairs of golden-yellow wings with brown spots, and as it has become domesticated in the course of long generations of captivity, the workers tell

that, after it has emerged from the cocoon and deposited its tiny eggs, it does not seek to fly out into the sunshine, but just hovers about the tray or box where it was hatched, during the few days of its full-fledged existence.

We visited some of the villages in the neighbouring valleys. Many of them, like Aleigh and Ainzahalta, had summer visitors from Cairo and Alexandria who had come up to escape the heat.

One day we penetrated to a Druse village, walking in and out of the narrow lanes, and getting glimpses of their comfortless-looking dwellings beyond. They are not a social people, being unlike the Arabs in this respect. Of course their religion tends to unsocial manners towards strangers. It is a secret religion, and none but the "initiated" are admitted to their conventicles. There is a theory that it originated in the ninth century in an attempt to introduce reforms in the Moslem worship, while students of the subject find in it traces of a primitive form of Nature-worship. The devotees believe in one God: that He has appeared to man in several incarnations: that the material world has emanated from Him: that the souls of the virtuous pass after death into new incarnations of greater and greater perfection till at last they are absorbed into the Deity. They accept both the Bible and the Koran as inspired, and they believe in the freedom of the will in opposition to the fatalism of the Moslem creed. Polygamy is forbidden. Both men and women may be admitted as "Akils," that is, initiated members of their worship, after a year's probation to test their sanctity and ability to carry out the requirements of their creed. They live simply and abstemiously: wine and tobacco are forbidden, so too is extravagance in dress or ornament, and the women wear the veil, but not always, as we saw some handsome girls among them unveiled.

The Cedar Grove, that is the valley in which the few of the original cedars of Lebanon are still standing, is very inaccessible to ordinary travellers, so we had to be contented with seeing the younger trees—also venerable and grand—which flourish in some of the higher valleys. At one time the mountains would seem to have been "clothed" with cedars of Lebanon. Solomon must have caused great gaps in the forest when he bargained with Hiram to have countless trees felled and dragged down to the sea, whence they were floated to Joppa for transit to the capital. Sennacherib, the proud Assyrian invader in the seventh century B.C., boasted "I am come up to the sides of Lebanon and will cut down the tall cedar trees and the choice fir trees, and will enter into the forest of Carmel" (2 Kings xix. 19). Whether by the Assyrian or by later warriors, the great cedars have been ruthlessly hewn down, till now there are only about a dozen of the old ones remaining, and about three hundred of a younger generation to be seen growing in the upper valley. The branches of the cedar spread out around the trunk in flat layers, and the cone, which is about the size of a large cup, is perfectly smooth and solid, and sits upon the flat branch pointing upwards instead of hanging from a stem. The gum which exudes from the cone and from the young branches has a very pleasant aromatic odour.

Baalbek to Damascus.—Coele-Syria, or the Basin of Syria, is the upland

Plain of Baalbek, which lies between Lebanon and Anti-Lebanon. It includes some of the most varied and beautiful scenery of that delightful region, with bold mountains and richly wooded valleys, cultivated fields and fruitful orchards, thriving villages and busy farms.

Perhaps the most important, as it is the most striking, feature, is the river system and the abundant water supply. The four *great* rivers of Syria take their rise here, fed partially by the snows of Lebanon, but chiefly by the copious mountain springs. The principal springs of the Jordan issue from the base of Mount Hermon to the south-east, the Orontes and Leontes rise farther north, and make their way westwards to the Mediterranean after many curious turns and twistings.

FIG. 1.—General view of the Acropolis, Baalbek.

The fourth is the Pharpar, now known as the Barada. It rises on the same watershed, and flows eastwards to fertilise the otherwise arid region of Damascus, which stands on the plain of Northern Syria. It is said of Egypt that "without the Nile there would be no Egypt," so it may be said of Damascus —without the Barada there would be no Damascus.

We travelled from Ain-Sofar to Baalbek by rail, a distance of some twenty-five to thirty miles, and still at a high altitude—about 4500 feet above sea-level. The ruins are very beautiful and impressive. The name, it is thought, signifies the meeting-place or Court of Baal, the great deity of the Phœnicians. The most imposing of the three principal ruins is that of the Great Temple. It dates from the time of the peace-loving Antininous: all that now remains standing to testify of its former magnificence are six Corinthian columns and the more wonderful stones that have formed the substructure. They are enormous! Three of them are sixty feet in length by thirteen feet square —the largest masses of hewn stone, it is said, to be seen in the world;

and in the quarry from which these have been taken we see similar masses partially hewn, and ready to be squared. After the spread of Christianity the Great Temple was converted by the Emperor Theodosius into a Christian Church for a time.

The Temple of Jupiter, which is rather more perfect than the Great Temple, is not far away from it, and at some little distance beyond are the remains of a third sanctuary, circular in form and Corinthian in style. All are more or less falling into decay, having been pillaged in turn by Turks, and Tartars, and Saracens, and latterly, in the eighteenth century, shattered by an earthquake shock.

It is extraordinary to note the way in which German influence had penetrated to this remote region of antiquity. There were two German antiquarians doing "research work" in connection with the "remains." We counted some twenty packing-cases standing in the vestibule containing pieces of statuary, ornaments, vases, etc., ready for transport and directed "Das Museum—auf Berlin." No doubt Abdul Hamid had been heavily subsidised to grant the privilege of "scientific investigation" in this corner of his dominions. But the worst vandalism of all confronted us in the interior of the middle temple. A huge tablet of white marble had been let into the wall some twenty feet above the ground, on which was sculptured the legend that "William" had visited these ruins a few years before, and this was "his mark."

Beyond Baalbek, not far from Damascus, a point of the road is reached where a most wonderful view of the city and surroundings is obtained. One is apt to think of Damascus as a desert city. In one way it is, surrounded as far as the eye can reach by the boundless waste of yellow sand. But the city itself seen from this point looks like a great garden watered as it is by the many life-giving streams of the Abana and Pharpar. Evidently the sight had appealed to "William," as he caused a niche to be made in the rock and named the "Kaiser's view," and the dragoman was anxious to draw attention to it—not so much to the view itself, as to the mighty distinction put upon it by the German Kaiser's notice. Probably it is the same point from which Mahomet first beheld the city and refused to enter, declaring that man may not have an earthly Paradise!

The stream which has been in sight most of the way from Baalbek is the Barada. It winds its way eastwards through a deep gorge in the mountains—bare and wild looking, except where the sides of the river-bed are clothed with the richest vegetation. Suddenly the gorge widens, and the river of Damascus spreads itself out fan-like over the plain. Different branches are known by different names. "Are not Abana and Pharpar better than all the rivers of Israel?" Truly as life-giving streams they are; for this otherwise desert land doth indeed "rejoice and blossom as the rose." The river is deflected here and turned there, and guided, so that gardens and orchards and vineyards and every part of the city is bathed by it. Every tree that is pleasant to the eye and good for fruit seems to grow there. There were seven different kinds of fruit on the table of our hotel the day we arrived. Such peaches are not grown elsewhere, and unfortunately cannot be exported.

After fertilising this city in the wilderness, the river wanders away out into the eastern desert and is lost in a marshy lake about eighteen miles beyond.

Although Damascus is such an ancient city, yet there are few antiquities. There are about two hundred mosques, few of them of special importance. In the middle of the second century A.D. Damascus became a Roman provincial city, and after the Christianising of Rome it was made the seat of a bishopric, and the Great Temple was turned into a Christian Church. In 635 A.D. it was seized by the Moslems and became the seat of the Caliphate under the Ommiads, whose rule extended from the Atlantic to India. At intervals it has been the scene of cruel

Photo by Bonfils, Beirut.

Fig. 2. - The Valley of the Barada, Lebanon.

massacres of different Christian peoples by the emissaries of Abdul Hamid.

The "street which is called Straight" still extends throughout the breadth of the city, but in most parts it is anything *but* straight now, as the bazaars on both sides project themselves into the middle, and there is the usual concourse of loaded camels, shouting donkey-boys, and hurrying foot-passengers that one finds jostling each other in any Eastern city.

The appearance of the dwelling-houses from outside is not attractive. As in most Eastern cities, little meets the eye but a high, dead wall with a low door which opens on to a narrow passage leading to a central court, which sometimes has a fountain in the centre, surrounded with plants. The intention of this difficult entrance is of course to deprive passers-by of even a glimpse of the inmates. The decorations and furnishings, they say, are generally handsome but unrefined, as in the same class of houses in other Oriental towns.

In the bazaars we saw many beautiful specimens of the famous inlaid mother-of-pearl furniture; we also visited one or two of the factories where the inlaid silver and copper work (which is also a specialty in Damascus) is done. Coffers, ornaments, armour, etc., were in process of making.

The famous old Damascus blades are more readily to be seen in museums of Europe than in the city which gives them name. In the process of inlaying the pattern was first deeply engraved on the metal, then a wire of silver was cleverly pressed into the hollow thus formed, and then beaten into the interstices. It was pitiful to see the numbers of quite small children that were occupied in this work under the direction of a skilled worker; mere babies they seemed, sitting on the ground, their tiny hammers beating an endless and tuneless tattoo on the metal.

THE EARLY MAPS OF SCOTLAND—PART II.

(Maps in the Library of the Royal Scottish Geographical Society.)

By Harry R. G. Inglis, F.S.A.Scot., Custodian of the National Collection of Old Maps of Scotland.

(*With Illustrations.*)

The Royal Scottish Geographical Society, through the liberality of various donors, has been able to acquire the collection of maps belonging to the late Mr. Cash, and the more important of these, with others that have also come in, are now dealt with.

Maps of Scotland can generally be divided into three distinct outlines: first, the Mercator-Ortelius series from 1573 to 1654; the Gordon-Blaeu series from 1654 to 1745; and the present outline, which, for all practical purposes, commenced about 1745. As explained in the previous article,[1] we can tell which original has been followed by consulting the shape of the Hebrides.

But in the maps now under review a totally different and rather curious circumstance is revealed, for while there are practically only three important variations in the outline of the mainland and the Hebrides between 1570 and 1745, when we come to compare the outline of the Orkneys, no less than seven distinct shapes are to be found, in the same period. This clearly shows that survey after survey of these islands was attempted, yet in the current map lists, the only new map prior to 1750 is one issued by Sibbald in 1711.

It would therefore appear that the Dutch geographers, with the information derived from the seamen of their great fishing fleets, knew far more of the geography of these islands than ourselves; and Bowen, on one of his maps about 1745, states that he makes use of a chart

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[1] *Scottish Geographical Magazine*, June 1918.

published at Amsterdam, "the Dutch by their constant fishing in these seas being better acquainted with the navigation of the coasts than even the natives themselves." We have therefore to look to the Dutch maps for names and places in the Orkneys prior to 1695.

For the purposes of comparison, the various shapes of the Orkney Islands are mentioned in the tabulation of the maps that follow, and these represent the different and typical outline of each series, so that it is possible roughly to date a map by means of this distinction. It might also have been thought possible to have gained assistance from the outline of Shetland also, but, unfortunately, Shetland was not shown on any of the early maps of Scotland or Britain: in fact, Moll's map of Scotland (1714) was the first map on which the latter islands appear. To find early maps of Shetland we have to consult the Dutch sea atlases, Jacobz, 1644: Van Keulen, 1682: or Collins' *Coasting Pilot*, 1695. A summary of the various Orkney outlines appears on p. 381.

In the maps under review in the following lists one can only say that, generally speaking, they contribute little to our knowledge of the geography of the mainland of Scotland, as they are all copies, either of the Mercator-Ortelius, or the Gordon Blaeu outline, referred to in the previous article. There is one exception, however.

In 1578, seven years after Ortelius published his Atlas, appeared a little volume, published in Rome by the exiled Bishop of Ross (John Lesley), who wrote the book entitled *De Rebus Scotorum*, a treatise on the Scotch people, and prefaced it with a map. It is hardly likely that Lesley was anything of a geographer, but his presence in Rome was caused by his unwavering allegiance to Mary, Queen of Scots, and he could not set foot either in England or Scotland. So he wrote this friendly little volume in his exile, and he leaves us with the impression of a well-read man, whose loyalty of feeling and tenacity of purpose we cannot but admire. Apparently he was one of those friendly men who win esteem whenever they are met, for even his advocacy of the lost cause, before the English Court, was appreciated. Now the map that is inserted in this volume is clearly taken from some map of the British Isles closely resembling the outline of the Italian geographers, yet it is neither copied from Lafreri's map of 1562 nor Clodius' of 1558. The general outline is unquestionably the same, but Skye and Lewis are quite altered, while the place-names all over the map are different, and greatly increased in number. Comparing it with Ortelius' map, one suspects that the worthy Bishop must have been given an old Italian map, and that from Ortelius' Atlas he wrote in many new names where he thought they ought to appear, and this map is therefore no more than an Italian-Ortelius combination. Jedburgh has been put on the map on the wrong river, below Kelso. Dumfries is missed out, but his own "Chanonry Rossus" is clearly marked. It is therefore very doubtful if this map can be classed as an original map.

There is an amusing sequel to the long Latin inscription on the map, which, among other things, states that there are "XI." Bishops in Scotland. In the French edition of this book a different map is attached, and it states that there are "XL." Bishops in Scotland. Looking at the

map, it is quite clear that the engraver of the French map did not notice that the point after the "XI." was not the tail of the "L," and this little error tells us that the Italian map is clearly the original.

The other maps in the list fall into the previous groupings as to its source, and in the enumeration the numbers have been conjoined with the first list, so that the sequence can be more easily followed.

Map.	Date.	Scale, Miles to an Inch.	Source.	Orkney-Source.
1a. Lesley, . . .	1578	43	Italian	Crude
1b. Nicolay-Adair, .	1583		Ortelius	original
4a. Hole (for Camden),	1607	28	Mercator	Mercator
5abc. Hondius, . .	1630	30-12	do.	New
8a. Sanson (2 sheet), .	1665	9-11	Gordon-Blaeu	Hondius
9a. De Wit, . . .	1688	12-13	do.	do.
11a. Sanson-Jaillot, .	1696	9-11	do.	do.
11b. Schenk, . . .	1708	12	do.	do.
11c. Visscher-Schenk, .	1710?	11	do.	do.
12a. Allard, . . .	1720	12	do.	Collins
13a. Johnston (2 sheet), .	1722	12	do (for Camden)	Hondius
15a. Bowen, . . .	1745?	38	Moll	Collins
15b. Elphinstone, .	1745	14		M'Kenzie
17b. Dorrit (reduced), .	1751	10	Dorrit	M'Kenzie
17c. Sayer, . . .	1764	21	do.	do.
21b. Bell, . . .	1785	22		
22a. Ainslie, . . .	1792	16	Ainslie	
25a. Brown (4 sheet), .	c. 1800	7¼	do.	

1b. NICOLAY-ADAIR MAP (1583-)1688. In the original issue of this map, which was published in Paris in 1583, in a small volume giving a description of James Fifth's voyage round Scotland, the author of the map is given as Nicolay d'Aulphinois, a French geographer. As the map is merely Ortelius' outline, there is nothing to go by in regard to the question as to whether this was copied from Mercator's first map, Ortelius, or the unknown original map which Mercator copied; for while the mainland and islands follow Mercator-Ortelius, the Orkneys are different in some respects, and it would appear as if some original work had been put into them. James Fifth's voyage occurred in 1540, and as Ben's description of Orkney appeared in 1529 there is the possibility that this outline may have been influenced thereby. This map was used by Adair for his Sea Atlas of Scotland in 1688, and he has taken it and re-engraved it without change, adding his own name to that of Nicolay. It seems remarkable that, notwithstanding all his survey work in the south of Scotland, Adair has made no improvement in the outline, which he must have known was badly in need of correction.

4a. HOLE'S MAP.—This small map, which appeared in Camden's *Britannia* (1607), is one of the most confused maps of Scotland that exist. The title scroll "Scotia Regnum" is copied from Mercator's map, but the map itself, with its wavy outline, perpetuates an antique Gothic style of drawing, to which we are not accustomed. Though it is copied from Mercator's map, the jagged and fanciful shapes of the islands,

that result from the curvilinear style, make it very trying to the eyes. The style, however, appears in ancient manuscript charts, and was apparently "antique," and well understood at this period, Porcacchi's maps being done in the same style. The only identification mark on the map is the name "Guli Hole Scup" at the right-hand bottom corner. As a map it is of no value.

5abc. HONDIUS' MAP.—This is merely Mercator's three maps with his name scraped out and "apud Henricum Hondius" inserted instead. So carelessly has the deletion been made that the flourish at the "Per" of "Per Gerard Mercatorem" of the former issue is plainly visible still on the plate. The sea shading has also been polished out. But the most noticeable feature of the map is that the Orkney Islands have been re-engraved with a totally different outline, and we know of no British survey of these islands at that period, so that apparently the Dutch must have had a fresh survey available then.

8a. SANSON'S (First) MAPS, 1665, Gordon-Blaeu outline.—The first copier of the maps in Blaeu's Atlas appears to have been Sanson, who, the moment Blaeu's privilege expired in 1665, at once issued a map of Scotland based on them. The maps are titled, "Scotland de la le Tay," and "L'Ecosse de'a le Tay." A good many copies of these maps appear to have been issued under different dates, but the first issue was unquestionably 1665, as I have seen copies of both maps with these dates, and there is no change in the map. The date on the Society's copy is 1740.

Apparently this map was the one mostly used by the later Dutch geographers to copy from, because the interesting feature is that in this map Ailsa Craig, on the Clyde, and the Isle of May on the Forth, have been missed out, and we shall subsequently see that a certain number of the Dutch geographers also missed out Ailsa Craig, and a certain number the Isle of May, and from this we can at once tell which original has been followed.

9a. DE WIT'S MAP, *circ.* 1688.—This is a rather coarsely executed map (compared with the fine work of the other Dutch geographers), copied evidently from Sanson, as it omits both Ailsa Craig and the Isle of May. This map is always found in *Visscher's* Atlas about 1680, apparently because Visscher had then no map of Scotland of his own. There are two issues of this map that are quite distinct, the first with no degree lines across the sea, and the later issue with the degree lines running across the map. It is to be presumed that the latter would be done when Visscher ceased to use the map, after engraving one for himself.

11a. SANSON-JAILLOT.—This map, also from the Gordon-Blaeu outline, is not to be confused with Sanson's earlier and rather smaller map. Sanson was the geographer to Louis XIV., and appears at that period to have been considered one of the most capable geographers, for his name and that of his sons was one to conjure with, well forward into the 1700 period. His first work goes back to 1644, when he speaks of himself as of Abbeville. His first map of Scotland appeared in his map of Britain, 1641, and most of his earlier work has a rather crude appearance, but

his later work is well done, and in this fine large 2-sheet map, issued by his successor, Jaillot, in his great atlas, Sanson's name is kept on as being the greater star. Sanson died in 1667, but his sons carried on the business. This map, as distinct from the earlier map, omits Ailsa Craig but inserts the Isle of May.

11b. SCHENK'S MAP, dated 1708.—This is a map of which there are apparently not a great many copies, and it is not to be confused with the Visscher-Schenk map referred to next. There were two Schenks—father and son—and this map, which was apparently copied from Sanson, was that issued by the older Schenk. The map is rather coarser in style than the usual Dutch maps of that period, and presents no special features. Ailsa Craig and Isle of May are both omitted.

11c. VISSCHER-SCHENK MAP.—This is Visscher's plate referred to above (and more fully in the previous article), but with the name "nunc apud P Schenk Junior," below Visscher's title. As already stated, Visscher's plate is by far the most tasteful and detailed of all the copies of the Gordon-Blaeu outline, and Visscher seems to have spared no expense in the get-up of his maps. It will be noticed that in this map Ailsa Craig is omitted, but Isle of May is inserted. It would, therefore, appear that copies of the earlier maps by Sanson missed out both islands: copiers of Visscher only one. As Schenk, junior, appears to have got all Visscher's plates, he seems to have put aside his father's map—which was not nearly so good as Visscher's—and added his own name as already described.

12a. ALLARD'S MAP, *cir.* 1720.—This is another map of Scotland from the Gordon-Blaeu outline, issued by another of the Dutch atlas publishers, and evidently copied from Sanson, as it omits Ailsa Craig and Isle of May. This same plate passed on to Covens and Mortier, who deleted Allard's name, inserted their own, and issued it in their atlas about 1730.

13a. JOHNSTON'S MAP, 2 sheets, 1722.—These two sheets formed the maps of Scotland issued in Gibson's edition of *Camden's Britannia* in 1722. They are beautifully clear maps, but as they are copied from Visscher they are of no intrinsic value. The maps are titled "A New Map of the South (or North) Part of Scotland. And. Johnston, Delin. & Sculpt."

Summarising the group of geographers who used the Gordon-Blaeu outline, and omitted or inserted the two test islands—Ailsa Craig and Isle of May—the following are the results.

Maps omitting both Ailsa Craig and Isle of May—

Covens and Mortier, *cir.* 1730; Sanson, 1665; De Wit, *cir.* 1688; Schenk, 1708; Allard, 1720.

Maps omitting Ailsa Craig only—

Sanson, *cir.* 1689; Visscher, 1690; Valk, 1705; Johnston, 1722; Overton, 1715; Homann, 1730; Seutter, 1730.

15a. BOWEN'S MAP, *cir.* 1745.—Emanuel Bowen's map is almost too small to be of much service, but there are several notes on it which seem worth attention, and the most important one is "In drawing the Eastern coast and the islands of Shetland, and some of the Orkneys, we

have principally adhered to a chart published at Amsterdam, the Dutch by their constant fishing in these seas being better acquainted with the navigation of the coasts than even the natives themselves." The second note is a tragic story (at the Orkneys); "On this rock the *Succia* of Gottenburg, from Bengal, perished, November 1740."

15b. ELPHINSTONE'S MAP.—This large map, issued in March 1745, and dedicated to the Duke of Cumberland, appeared just prior to the Jacobite rising. Worked up from the best sources then available, and engraved by Kitchin in his neat small lettering, it gives much more detail in one sheet than any other map then issued. It was much used by the military at that period, as the copies in the King's Library (British Museum) show the military dispositions of the guards along the routes, and other interesting military details, filled in in ink by the hands of the staff officers. Apparently it was then considered one of the best maps of Scotland. As it is one of the earliest maps showing the roads, it is of some small value, but it is very doubtful if it can be reckoned as very accurate, as it appears merely to have been worked up from Moll's atlas and Adair's maps, and consequently the roads are very unevenly marked: there is, for instance, only one road shown in Fife, the road from Burntisland to Kinross. For this reason it cannot be taken as a reliable guide to the roads then existing.

17b. DORRIT'S MAP (reduced), 1751.—Little need be said about this map, as it is merely a copy of Dorrit's fine 4-sheet map which was issued the year previously, and was at that time the best map of Scotland. In this map also the roads are very scanty, there being no road shown in Kirkcudbrightshire, and only one in Ayrshire—the Glasgow and Stranraer road—so that it also cannot be regarded as an absolute guide to the roads at that period.

17c. SAYER'S MAP, 1764.—This small map, copied from Dorrit, is of no special value, as it is very sketchy in some respects.

21b. BELL'S MAP, 1785.—This map, though of no intrinsic value, is interesting, as the author marks on it various lines of communication which ought to be constructed in the Highlands. Suggested canals are also described, and in marginal print the advantages to be gained by the scheme are carefully laid out. In the top margin is a small plan of Lochboisdale, in South Uist, made by the author, and this gives this little sheet a special value for that locality, as it is probably the first plan of that part.

22a. AINSLIE'S SMALL MAP, 1792.—Ainslie's great 9-sheet map has been already referred to as having been issued in 1789, and this exquisitely engraved little map is one of the best hand-maps of Scotland. The lettering is very small and distinct, and the most minute details are given, so that it is really a much better map than many of the larger and more pretentious sheets. An itinerary of roads and distances is given.

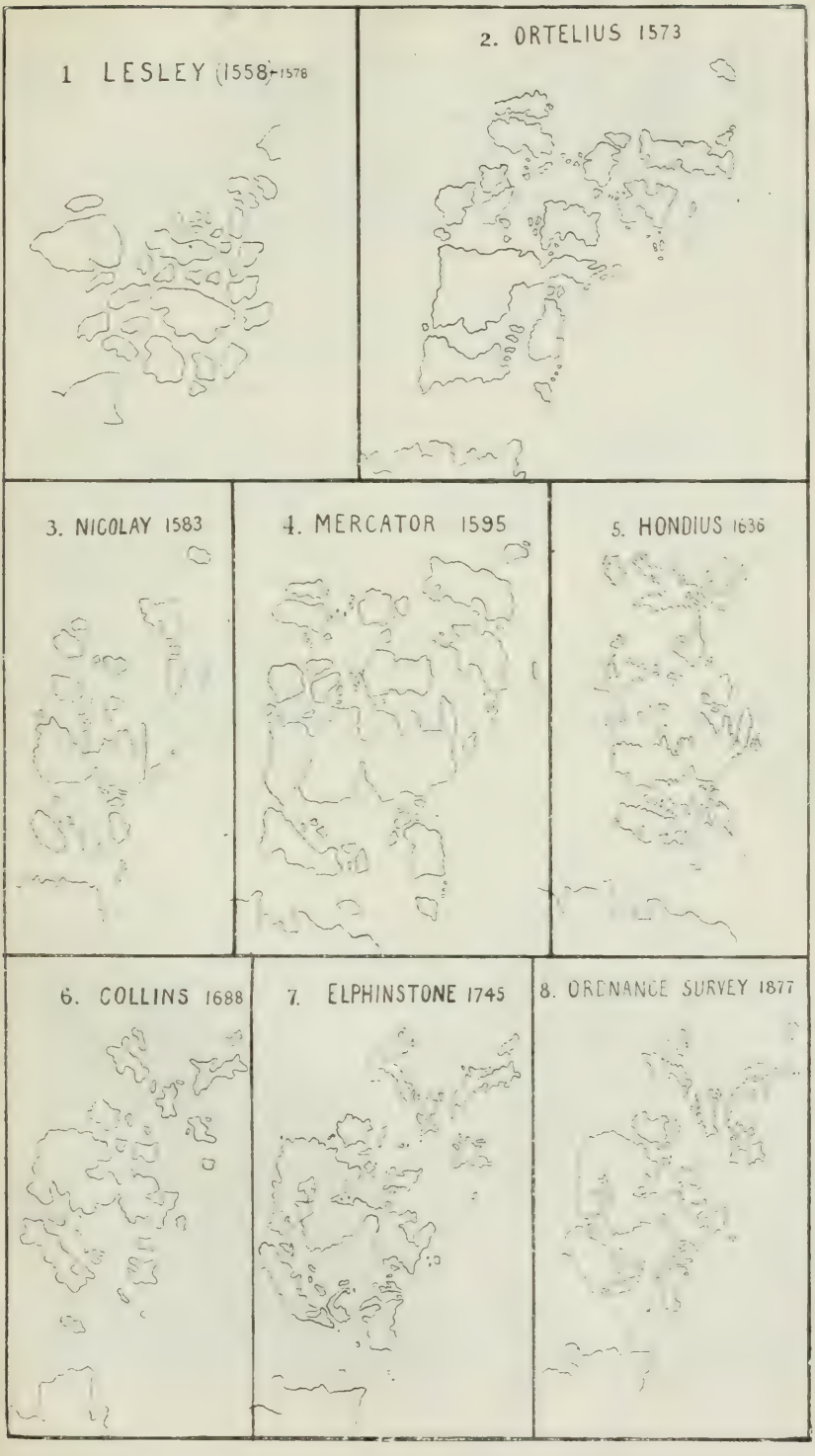
25A. BROWN'S MAP (*cir.* 1800), four sheets. With its pretentious dedication to the Duke of Argyll, and its statement that it is reduced from Ainslie's map, one would imagine this would be a useful map, but it is not too much to say that this is the worst Map of Scotland ever

issued, and its proper place is the waste-basket. Galashiels is placed at Leaderfoot, Ruberslaw is put on a range of hills on the wrong side of the river, St. Mary's Loch is missed out; Forres, Kirkwall, and Stromness are omitted; Drumlanrig is put close to Moffat on the Annan, instead of the Nith, while the engraver has not even taken the trouble to put in the town marks indicating where either Lochmaben or Thurso should be. The names are inserted and spelt wholly regardless of Ainslie's map, which was one of the most careful and accurate maps of Scotland at that period—and everything points to an utter indifference on the part of the engraver and publisher as to whether the map was accurate or not. To take the better known names, Arthur's Seat is spelt Atheur's Seat; Kirkmichael goes in as Kirkimcheal; L. Dochart as L. Dochbat. But the worst feature in the map is that, with the exception of the chief towns, only a proportion of the names read to the proper places, and, to take a few examples in addition to those mentioned above, Eddleston is placed at Romanno Bridge, Kirkliston is put close to Linlithgow, the Eildon Hills at Maxton, and St. Boswells is marked Melrose. The explanation of what might be called the irresponsible placing of names is likely to be found in the map having been engraved by an engraver only accustomed to lettering, and when the names were engraved on the plate, the work of inserting the town or village positions was turned over to a raw apprentice, who, being either untrained in marking them in on the plate (which has to be done reversed), simply impressed the graving tool at one end or other of the name already engraved, quite regardless of what the result would be. Taking the examples already given, if the town position of Galashiels had been put at the G, the place would have been correct, but it was put at the terminal S, and thus is miles away from its true position. Eddleston, in the same way, has the stamp at the wrong end, and thus reads to the wrong river. The worst of the sheets is unquestionably the Edinburgh sheet, but the evidences of carelessness of the same kind are all over the map, so that one can unhesitatingly call it the worst Map of Scotland.

The outlines of the Orkneys referred to on p. 380 and illustrated here give the names of the maps using them, but it is quite evident that in most cases some surveyor, whose name is not known, has issued a map which has been made use of. Comparing the more ancient and the modern outline, it is astonishing to notice the variations, as well as the irreconcilable forms of the outline of the islands.

1. Lesley (Rome, 1578).—This is given merely as a curiosity, to show the outline that was current in the maps used by the Italian group of geographers, *cir.* 1560.

2. Mercator-Ortelius (1573).—The same outline that appeared on Mercator's map of Britain in 1564 is used by Ortelius in the map of Scotland in his Atlas. In this book the number of islands is given as 31, and as this number is specified by *Ben* in his *Description of the Orkneys* in 1529, it is apparent that this has been available. The same outline is used in the French Lesley.


1 LESLEY (1558)-1578
2. ORTELIUS 1573
3. NICOLAY 1583
4. MERCATOR 1595
5. HONDIUS 1636
6. COLLINS 1688
7. ELPHINSTONE 1745
8. ORDNANCE SURVEY 1877

3. Nicolay (1583).—It will be noticed that for the first time a fairly reasonable sketch of Scapa Flow appears, together with the neck of land at Kirkwall. The most strongly marked feature is the longer finger of the land at the east end of the "Mainland."

4. Mercator (1595).—This does not seem a very great improvement on Nicolay. It seems to be a cross between the original Mercator and Nicolay, for the islands indicated in the first are kept the same size, but their positions are remodelled. Source unknown.

5. Hondius (1636).—I am not sure if this is the first date at which this totally changed outline has appeared, but it was the standard shape of the Dutch geographers till about 1730, and was used by Blaeu.[1] It is noticeable that in all these outlines the alterations are either in the islands to the north of the Mainland or to the south. The most strongly marked feature in this outline is the thorn-shaped island pointing northwards.

6. Collins (1688).—This chart, taken from Greenvile Collins' *Coasting Pilot*, shows for the first time a fairly correct outline of the Orkneys, and impresses us favourably with the excellent work done by the gallant Captain; his work is used by Moll and all the subsequent English geographers, but the Dutch school mostly used the Hondius outline.

7. Elphinstone (1745).—This is without doubt from the survey worked up by Murdoch Mackenzie, and in its general accuracy of outline is a testimony to the good work of this Scottish surveyor. A comparison, showing the outline of the Ordnance Survey of 1877, demonstrates how well the work was done single-handed by individual effort.

RECOLLECTIONS OF ANTIUM.

By F. W. Flattely, Aberdeen University.

It is curious that a stretch of Scottish coast should have reminded me of Porto d'Anzio or Antium, as it was known to the Romans. There is little enough resemblance between the Tyrrhenian littoral south of Rome and the coast of Aberdeenshire. Some trick of April sunshine as it fell on the curved shore was nevertheless sufficient to stir a willing memory, and so to suggest the stretch of sand which fringes the Pontine Marshes between Anzio and Torre Astura.

The ordinary English visitor to Rome does not know Anzio, but there must be few visitors who have not stood on the crest of the Appian Way where it crosses the shoulder of the Alban range. On the way up the tourist will have been thrilled by his first glimpse of the

[1] In the lists of Manuscript Maps in the Pont-Gordon-Adair Collection in the Advocates' Library a curious error was made many years ago, for the map there stated to be the Orkneys is in reality the Shetland Islands. This is only mentioned for the guidance of students from a distance, who may expect to find a manuscript map of the Orkneys there.

sea above the rich foliage of the vine. Far below, directly to the south, where the brown Campagna melts into the golden Tyrrhenian, the village of Anzio is situated. Now a small port engaged in the coasting trade between Leghorn and Naples, and with a reputation for the quality of its sardines, Antium in Roman times was the favourite resort of the Emperors. Its foundation is ascribed by some to Anthias, son of Circe and Ulysses, by others to Ascanius. Certainly the enchantress Circe had her dwelling at no great distance:

"Vedi quel monte, ove si digiuna
Circe piu volte fece i suoi incantesimi
Al lume del sole, e della luna."—

F. DEGLI UBERTI.

On fine days the blue mass of the Circean Mount is plainly visible from Anzio, apparently an island, but really connected with the Volscian massif by a wide tract of malaria-haunted marsh.

He would be a dull person indeed who refused to credit magic when, at sundown, the great rock swims like a purple cloud above a turquoise sea, and the sun's parting rays gild the rugged heights of the Volscians—that rough cradle of a hardy race.

Antium often served as the centre of the Volscian Confederation. She was early at war against Rome, in alliance with the Hernicans and Aequi, and under the leadership of Coriolanus, who had been exiled from Rome in connection with the troubles between patricians and plebs. Although Coriolanus, yielding, we are told, to his mother's entreaties, eventually withdrew, the war continued with varying fortune for a long period. Finally the town was captured (the last of the Volscian cities to be definitively subdued) by Camillus and C. Menius Nepos, and the prows of her ships were removed to Rome to adorn the Forum.

When Antium is next heard of it is as the favourite summer resort of the Emperors. Caligula was born there, and probably Nero also. The latter was particularly devoted to Antium, and built a magnificent port, together with a sumptuous villa for his own use. Remains of both these structures are still to be seen in the shape of huge blocks of masonry and masses of *opus reticulatum*, the former a considerable distance from the shore. The jetties of the old harbour are said to be some ten metres thick, built of blocks of tufa cemented with *pozzolana*. They have been used in part as the foundation for the present mole. The project, however, was not a happy one, as the filling up of the arches of the Neronian mole assisted in the accumulation of sand, and continual dredging is now necessary to make the harbour available for ships of two hundred tons burthen. From the ruins of the villa of Nero were obtained the statues known as the Borghese Gladiator and the Belvedere Apollo, now in the Louvre and Vatican respectively.

At first sight the sea would appear to have advanced since Roman times, but it is evident from the cliffs, with their abundant fossils, that there was a period when it reached a point considerably above its present level. These same yellow cliffs are festooned with the rich growth of a beautiful green, drought-resistant plant, or "erba grossa,"

which bears great crimson blossoms. The effect is extraordinarily decorative: a scene painter particularly would find it a source of inspiration.

Walking along the rocky shore towards Nettuno, a couple of miles farther south, one has only to stoop to pick up innumerable fragments of many of the most precious marbles—verde antico, giallo antico, alabaster, porphyry, pavonezzetto, serpentine, and others. These and the masses of masonry already alluded to are all that remain of the wonderful villas, baths, and temples that once lined the shores as far as Torre Astura.

With Nettuno there begins the desolate wilderness of the Pontine Marshes. From here to Terracina there is not a single dwelling to vary the monotony of this melancholy tract. It would be wrong, however, to suggest that the Pontine Marshes possess no beauty; for many people this desolate country has a considerable fascination. But it has a sinister record. One thinks of the deserted city of Ninfa. Why this town was so suddenly abandoned has not been thoroughly explained, but one may surmise that the real reason was malaria. Where the Anopheles mosquito is allowed to find its ideal conditions of existence, man can have no place.

Probably the shore line in Roman times was healthy enough, particularly if the grounds of the numerous villas were cultivated to any extent. The coast near Torre Astura will for ever be associated with the name of Cicero, who was assassinated not far from here, while attempting to embark for Macedonia after his proscription by the Second Triumvirate. Merivale, in his *History of Rome*, gives the following dramatic account of the great orator's end: "Marcus Cicero was with his brother Quintus at his Tusculan villa. On the first news of the proscription they gained Astura, another of his villas, on a little island off the coast near Antium. From thence they proposed to embark for Macedonia. Quintus, indeed, was promptly seized and slain; but the surviving fugitive gained the sea, set sail, landed again, again embarked, and landed once more at Formiae in anguish of mind, and perhaps of body also. In vain was he warned of the danger of delaying. 'Let me die,' he replied, 'in my fatherland which I have so often saved.' But his slaves now shut their ears to their master's moans, placed him in his litter and hurried towards the coast. Scarcely had the house been quitted when an officer named Popilius—a client, it was said, whose life Cicero had saved—approached and thundered at the closed doors. A traitor indicated the direction taken by the fugitive, and Cicero had not yet reached the beach when he saw the pursuers gaining upon him. His party were the more numerous, and would have drawn in his defence, but he forbade them. He bade his slave set down the litter, and, with his eyes fixed steadfastly on his murderers, offered his throat to the sword. Many covered their faces with their hands, and their agitated leader drew his blade thrice across it ere he could sever the head from the body. The bloody trophy was carried to Rome and set up by Antonius in front of the Rostra. He openly exulted in the spectacle, and rewarded the assassins with profuse liberality. Fulvia, it is said,

pierced the tongue with her needle, in revenge for the sarcasms it had uttered against both her husbands."

From the beginning of the third century as far as the sixth all record of Antium is lost. The port was occupied by the Goths, and, like so many other points on this coast, it suffered from frequent raids by the Saracens. In 1378 it had become uninhabitable, and was abandoned; later on it was repopulated by Sixtus IV. The burgh which gave origin to the modern Anzio is supposed to have been built by the Frangipani, lords of Astura, in the thirteenth century. Subsequently Anzio came into possession of the Colonnas, from whom it was taken by the Popes, becoming the property of the Holy See. Finally it was sold to the Borghese family, who now own most of the land in this neighbourhood.

. . . . . .

Near Torre Astura is a sea-water vivarium reputed to have belonged to the villa of Lucullus. The Princess Borghese was said to have some idea of asking the writer whether this vivarium was capable of being restored. Nothing more was heard of the plan, however, which was a pity. To restore the fish ponds of Lucullus—what an ideal task for the naturalist whose hobby is antiquity!

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

At Meetings of Council held on May 14th and September 17th, the under-mentioned ladies and gentlemen were elected members of the Society:—

Ordinary Members.

James A. Tod
Robert M. Craig, M.A., B.Sc.
George D. Sprot.
Wm. Elliot, I.S.O.
Michael C. Andrews.

Associate Members.

Miss Dorothy Beale.
Miss E. Edmunds.
Francis N. Sweet.

The Lecture Session.

A programme of five lectures at all centres is being arranged for the coming session. The opening lecture, in Edinburgh in November, will be delivered by the Hon. Sir Thomas Mackenzie, K.C.M.G., High Commissioner for New Zealand, on "The History of the New Zealand Fiordland, and a Reference to the History and Development of the Dominion," and will be illustrated by cinematograph views and lantern slides. The second lecture, in the following month, will be delivered by the Very Rev. Sir George Adam Smith, Principal of Aberdeen University, on "America and the Great War." The next lecture, in February, will be by Cav. Filippo de Filippi (Hon. K.C.I.E.), on "Italy at War." Arrangements have not yet been completed for the two

remaining lectures in March and April, but it may be mentioned that the Right Hon. W. M. Hughes, P.C., Prime Minister of Australia, has been invited to lecture, and though he has not as yet been able to accept the invitation definitely, he has promised to let the Society know as soon as possible in the event of his being able to do so.

GEOGRAPHICAL NOTES.

Asia.

Old Caravan Roads in the Near East.—In the July issue of *The Nineteenth Century* Mr. F. D. Harford publishes an article on "Old Caravan Roads and Overland Routes in Syria, Arabia, and Mesopotamia," in which he discusses former lines of communication between Basra and Baghdad and the West. He gives an interesting description of the desert route which formerly ran from Basra to Aleppo, and at one time was part of the route between Bombay and London. The route ran entirely through the Great Desert, following a chain of wells and springs, but never touching the Euphrates, and not passing through any town. During the eighteenth and the early part of the nineteenth century some of the official correspondence of the East India Company went by this route, and in a book published in 1795 the time required, under the most favourable conditions, was given as from 90 to 101 days from Bombay to London, and from London to Bombay sixty-four to seventy-nine days' actual travelling. This route is now only used by Bedouins. The more northerly routes from Baghdad *via* Deir and Palmyra, and through Meskene and Aleppo are still used both by camel and mule caravans. It is difficult to say when caravans ceased to travel between Basra and Aleppo, but in 1822 the British Consul-General spoke of caravans of 2000 to 3000 camels going from Baghdad to Aleppo in spring and autumn. In 1834 the British Consul at Baghdad described all the roads to that town as unsafe for small parties, though some traffic was certainly carried on, for in this year European produce to the value of £250,000 was brought to Baghdad by caravans. The routes from Damascus and Aleppo by Diarbekr, Mardin, and Mosul were described in this year as being "absolutely impassable except for an army."

The Basra to Aleppo route forms also the subject of a detailed article by Mr. Douglas Carruthers in the September number of *The Geographical Journal*. This article gives a detailed itinerary of the route as followed by different travellers from the sixteenth century onwards.

Quetta to Mashhad and Kirman: Extension of Nushki Railway to Dalbandin and Mirjawa.—In two papers, written respectively by the Right Hon. the Earl of Ronaldshay and by Mr. S. H. F. Capenny, which appeared in this *Magazine* for April 1902, the route from Quetta to Mashhad is described, and the relation of the Nushki route to

Eastern Persia is discussed in detail. In *The Times* of the 16th August 1918 it was announced that an Anglo-Indian Force had been concentrated in North-East Persia in order to guard against dangers arising from the state of anarchy prevalent in Turkestan. These troops, which have been brought round the southern and western sides of Afghanistan and through Sistan, are based on Mashhad, and are working up the Trans-Caspian railway. Their concentration has been much assisted by the extension of the Quetta-Nushki railway to Dalbandin, which is some 90 miles south-west of Nushki. From Dalbandin the line is now being carried another 160 miles to Mirjawa (east of Ladis in Persia, on the sketch-map of 1902), which is 350 miles from Quetta and 2852 feet above sea-level. The prolongation of the Nushki railway to Mirjawa will further facilitate the trade route from Kirman to Quetta, which was established in 1900 by Major Molesworth Sykes.

America.

The True Source of the Amazon.—The Rev. O. R. Walkey sends us the following note on this subject:—As a contribution towards settling the question whether the Marañon or the Ucayali represents the true headstream of the Amazon, it may be worth pointing out the almost complete analogy subsisting between the Rio Negro-Solimões confluence just below Manaos and that of the Marañon-Ucayali just below Nauta. Ascending the Amazon towards the first-named, we find that the north bank stream, with its slower current and contrast of clear, dark water, supplies (1) the direct course, (2) the wider and probably deeper channel, (3) supports a little way up its north bank the important city of Manaos. Notwithstanding these points the stream in question—the Rio Negro—is plainly tributary to the other—the Solimões—which, in spite of its rectangular bend to the left, is rightly regarded as the main stream on account of (1) its much greater length, (2) far greater extent of free navigation, (3) uniformity of current with that of the Amazon below, (4) preservation of its mud-coloured water.

Ascending the course of the Solimões for 1140 nautical miles, we find in another north bank stream—this time the Marañon—again the change in colour of water, though here to clear blue instead of the black of the Rio Negro, and a much less marked change in the current, but with all the three remaining other conditions as to course, width, etc., repeated, Nauta representing Manaos on a much smaller scale. Conversely, the Ucayali, with a right-angle bend to the left as before, repeats the features of the Solimões in the greater lengths of water and of free navigation, with conformity of current and of colour of water. There should, therefore, be no more doubt in accepting the Ucayali for the main stream, with the Marañon as its left-bank tributary, than there is in giving a like verdict for the Solimões lower down.

One point where the analogy fails, it should in fairness be stated, is that while the three main tributaries, the Rio Branco, Uaupes, and Icana, belonging to the Negro-Guainia system, cannot compare with such rivers as the Purus, Japura, Jurua, and Putumayo entering the

Solimões, the Marañon's chief tributaries, the Tigre, Huallaga, Pastasa, and Morona, are certainly greater than any of the Ucayali's tributaries, excepting the Urubamba, though the total navigation offered by all the tributaries of the Ucayali rather exceeds that available on the confluents of the Marañon. This solitary failure cannot, however, outweigh the evidence of the coincidences named.

Another argument that may fairly be raised in favour of the Marañon as the headstream is its extension farther westward by some five degrees at the bend. Each river, however, has its source more to the south-south-east, so this point is one merely of direction. The Amazon, in either case, forms a gigantic pot-hook bend pointing downwards in the South American continent, and the argument scarcely carries as much force as appears at first sight.

At the time when Wallace wrote in favour of the Marañon the real length of the Ucayali-Apurimac course was unknown and much underestimated. It is some 570 nautical miles longer, and navigable for perhaps 670 nautical miles farther than the Marañon above their confluence. This, furthermore, implies continuous navigation to within 100 miles nearer its source than one can approach the source of the Marañon, probably a total of 3000 nautical miles *via* the Ucayali, as against 2330 along the Marañon.

If we meanwhile adopt as the Amazon mainstream the river Ucayali, which, under the name of Apurimac, rises, according to Raimondi's 1:500,000 map (1896), at Lake Villafro, in lat. 15° 26′ S., and long. 72 12′ W. of Greenwich, we have this lake as the true source of the Amazon, which has a course of some 3350 nautical (3850 statute) miles thence to the Atlantic Ocean.

The Yana Indians.—Under this title Mr. T. T. Waterman publishes in No. 2, Vol. 13, of the University of California Publications in American Archæology and Ethnology an exceedingly interesting and sympathetic study of a virtually extinct stock of Californian Indians. The importance of the paper is historical and social rather than primarily geographical or even ethnological, but it contains many points of general interest, and has some beautiful illustrations.

The term Yana is applied to a group of Indians distinguished by the fact that they spoke dialects of a common speech, and inhabited a fairly well-defined area in the region of the upper Sacramento. Their numbers appear always to have been small, an estimate—probably excessive—giving three thousand as that existing at the time of the first white occupation. This figure includes peoples speaking four variants of the Yana language and having no political unity among themselves. No great differences in culture and mode of life separate them from the other Indians of California, but they appear always to have been a weak group, pressed on by their more powerful neighbours, and they disappeared with great rapidity before the incursion of the whites.

Of the four groups, as defined by dialectic variations, one was the Yahi. The paper is especially devoted to an account of the last surviving member of this division, who lived for about five years at the

University of California, having been found in 1911, in a state of great exhaustion, some thirty-two miles from San Francisco, in a township where his appearance gave rise to some excitement.

At the University, where he was ultimately attached to the Museum in the capacity of helper, he adapted himself readily to civilised life, but displayed great susceptibility to the civilised disease of tuberculosis, which carried him off in March 1916. During his residence there Mr. Waterman obtained from him much interesting information in regard to the life and habits of his people, though the difficulties of intercourse always remained great.

From the information obtained from this Indian and from other sources, it appears that the Yana were always a foothill people, occupying the wild volcanic region between the slopes of the Sierra Nevada and the Upper Sacramento valley in the area between the tributaries known as the Pit and Feather rivers. They appear to have lived below the belt of pine timber on the Sierras, and on the other hand never to have been able to establish themselves in the Sacramento valley proper, where the terrain is very different from the lava of the foothills region. Their food appears to have consisted of wild berries and seeds, notably acorns, fish, especially salmon, which were speared with a two-pronged harpoon, and deer meat, the deer being shot with bows and arrows. The clothing consisted of skins of wild animals, and they were sufficiently skilful hunters to shoot both bears and wild cats, whose skins were utilised. The dwellings were rough lodges of poles, covered with brushwood, and fish and meat were dried for the winter. The arrow points were very skilfully made, originally from obsidian, flint, or agate, but the Indians soon learnt that the white man's glass flaked more evenly than obsidian, and regularly utilised it. Some of the finest arrow points made by Ishi, the University Indian, were made of bottle glass. Snares were made of wild fibres, and—a somewhat interesting point—at one camp a circular pit was found, in which snow was packed in winter. As this melted in the warmer season it supplied water, and obviated for a time the necessity for going down to the deep cañon in which the creek near the camp flowed.

The Indians came first in contact with the whites through their attacks on the oxen, horses, and mules of the latter, all of which were eaten. Further, and even more important from the white man's point of view, they acquired the habit of robbing the food stores in the cattlemen's cabins. They habitually carried off the whole stock of provisions found in these, and thus inflicted great loss and inconvenience on the owners, who were in the habit of laying up supplies in advance to last for the whole season during which the cattle were "rounded-up." The result was a ruthless war upon the Indians, in the course of which the Yahi were totally exterminated, and the other groups reduced to a few dozens. The Indian robberies were always carried on in spring, when their winter food supplies had been exhausted, and may have been due, in the first instance, to the fact that the coming of the white man had made the game wilder. In any case spring was always a time of shortage with the Indians.

The above is the merest outline of the contents of the monograph, which we recommend to the notice of all those interested in primitive peoples.

General.

The Cossack Communities of European and Asiatic Russia.—We have received a reprint from the *Journal* of the Central Asian Society, containing a lecture delivered by Miss M. A. Czaplicka before that Society, under the title of "The Evolution of the Cossack Communities." The paper, which is largely historical in its mode of treatment, contains much that is of great value in forming judgments on present conditions in Russia.

The author, in the first place, draws a sharp distinction between the true Cossacks, who live both in eastern Europe and in Asia, and the Turkic Cossacks or Kaizak, called Kirghiz by the Russians, who are of purely Asiatic blood.

The first number about five and a half millions, males greatly predominating over females, and are found both in European Russia and in Siberia. Under pre-revolutionary conditions they owned a large amount of land, varying from 14 acres per head in Kuban to 100 in Transbaikal. Generally the amount is from three to four times more than that owned by the Russian peasantry. They were also free from taxation, but supported their own schools, maintained their own roads, and were obliged to render military service. Despite their large territories, agriculture occupies a somewhat subordinate position, the chief industries being fishing and cattle and horse breeding. Agriculture is carried on by primitive and wasteful methods, and much of the land is either unutilised or let to non-Cossack peoples. In some cases the vine is cultivated for wine, and tobacco is also grown. Asiatic Cossacks are great traders.

The present political position of the Cossack communities has been greatly influenced by the action of the Bolshevik revolutionaries. At the beginning the Cossacks joined the revolutionaries of the Right, but the later formation of a separate Cossack party was due to the fact that the Bolsheviks desired to appropriate their land, of which, as already stated, they have proportionately much more than the ordinary Russian peasant. Their privileged position also gave rise to jealousy. In the Ukraine, on the other hand, the Cossacks have united with the other members of the new state.

The Turkic Cossacks number four to five million and are seminomadic. They inhabit the region between the Caspian and the Pamir, and form the advance guard of the Turks of Bokhara, Khiva, and other parts of Turkestan. They are not very strong Moslems, a fact which separates them from the Turks proper, but have always been in opposition to the Central Russian Government. Dissensions between them and the Russian Cossacks were deliberately fostered by the former Russian Government, but friendly feelings, before the Revolution, had grown up between them and the progressive element among the

Siberian colonists. The author considers that their future action will be a very important factor in determining the course of events in Russia, and holds that only two possibilities lie before them. They may, on the one hand, support the progressive Siberians who are working for an all-Russia federation, or they may throw in their lot with the Central Asian Turks, among whom German-Osmanli propagandists are working for the separation of the Turkish peoples from Russia. As Miss Czaplicka observes, with justice, it is unlikely that Bolshevism will make any permanent impression upon them, for Bolshevism has its foundation in industrialism, and there is practically no industrialism among these peoples. The lecture is especially interesting in that events since it was written seem to tend to confirm the suggestion, implied in the paper, that the Siberians are destined to play a great part in the future of Russia, especially in constituting a nucleus of resistance to the extreme revolutionary position.

NEW BOOKS.

EUROPE.

Boundaries in Europe and the Near East. By Col. Sir Thomas H. Holdich, K.C.M.G., etc. London: Macmillan and Co., Ltd., 1918. *Price* 8*s.* 6*d. net.*

This book may be described as the application to problems arising out of the present war of the principles set forth in the author's previous volume on *Political Frontiers and Boundary Making*, already reviewed in this *Magazine*. Assuming that the great purpose to be kept in view at the final settlement is to prevent "the recurrence of such devastation and destruction as the War has caused," and referring to the great multitude of previous writings on the subject, the author considers that none of them, so far as he has seen, "takes sufficient account of geographical influence upon political dispositions in the great questions of territorial settlement," although "it is upon successful territorial settlement that the stability of future international peace must rest" (p. 2). The general principles on which successful territorial settlement, so far as can be determined by geographical considerations must be based, are set forth in the opening chapter, but the mere statement of his two main principles shows how difficult their application must be. "The first principle," he says (p. 5), "is the obvious necessity for dividing self-governing states or nations into separate geographical units in such manner as to set definite and scientific boundaries between countries liable to mutual aggression. The next is to give to each individual country space and opportunity for internal development such as may remove all incentive for discontent and desire for encroachment on other preserves." The book is an attempt to meet, within the area indicated by the title, these superlatively difficult requirements. In the introduction (p. x) the author declares that he is no politician and no prophet, but he evidently takes it for granted that the war must end in such a complete crushing of the Central Powers as to leave the Allies in a position to carve out Europe and the Near East as they please, and he is compelled from time to time to be so much of a politician as to take some account of political sentiment. As to the Balkan situation, he has to admit (p. 78) that "the solution of this most troublesome political problem will, probably, not depend on geographical issues, nor does it appear that it can be co-

ordinated with geographical interests." In his proposed settlement of Syria and Mesopotamia he expressly recognises (pp. 199-200) that he finds himself compelled to break up both an ethnic and a geographical unit. As the reason for desiring the disruption of Austria-Hungary, he frankly puts forward the political motive of restoring the Slavonic barrier between Germany and the way to the achievement of German designs in the Near East (pp. 42-5). And in making his new settlement of the members of the disrupted empire he is sanguine enough to believe "that the Magyars of Hungary would acquiesce in the separation of Slovakia, with no great or lasting feeling of resentment" (p. 47). On the other hand, in the short chapter on Alsace-Lorraine, a case in which, as he has often told us, his convictions clash with his sentiments, on which account he has included this chapter in response to pressure "with some reluctance," he attaches much importance to German sentiment. "A Germany," he says, "which believes herself to be despoiled of her rightful property will surely lay up for future years a grievance to be exploited and a wrong to be righted when the good time shall come and the opportunity present itself" (p. 214). Accordingly he considers the possession of the flat plains of Alsace as worth discussion, but he has no hesitation in restoring the whole of Lorraine to France, apparently ignoring the fact that Germany would fight for the Lorraine ores with a desperate tenacity, that she would not be disposed to exhibit if it were merely the flat plains of Alsace that were in question. A number of minor errors in spelling, etc., await correction in this volume, and there is one error quite remarkable in a man of Sir Thomas Holdich's general exactness. On p. 49 one first meets with a puzzling reference to the R. Moldau, and as one reads on to pp. 53 and 54 one discovers the explanation of the puzzle in the fact that that river is turned right round in the author's mind, made to send its waters through the Danube to the Black, instead of through the Elbe to the North, Sea. The error, indeed, makes no difference in the conclusion at which Sir Thomas arrives where the Moldau is considered, but it causes him to raise a difficulty which does not exist. The volume is provided with an index, a map of the Balkan Peninsula, and three sketch-maps.

Italian Mountain Geology. Part I. The Piedmontese Alps, Ligurian Apennines, and Apuan Alps. Part II., The Tuscan Subapennines and Elba. By C. S. Du Riche Preller. London: Dulau and Co., 1918. *Price* 2*s.* 6*d. per part.*

Geologists interested in Italian Alpine Geology, as well as geographers, will be glad to learn that Dr. Du Riche Preller's well-known synthetic essays are now collected in book form. The ground covered is so vast that a reasoned analysis of the volume is, of course, impossible, but the following brief indications regarding the scope of the work may be of use to the reader.

The first paper, entitled "The Morainic Walls and Lake Basins of Northern Italy," gives a succinct account of the great moraines of northern Italy and their relations to the six principal lakes—once fiords opening on an upper Pliocene arm of the Adriatic. In "The Permian Formation in Piedmont, Dauphiné, and Savoie," the author gives a summary of the main characteristics of certain gneissose rocks, for a long time a puzzle to stratigraphers, which extend from Mont Blanc to the Mediterranean. The Greenstones or "Pietre Verdi" of the Piedmontese Alps are the subject of a third paper, and are further described, together with other crystalline rocks, in a set of three papers on the "Crystalline Rock Areas of Piedmont." The seventh paper deals with the "Contact-Zones of the Alps and Apennines in Western Liguria." It gives an exposé of the much debated

structure of that famous region, the tectonic peculiarities of which are ascribed to overthrust phenomena by several geologists, while the author inclines to adopt an interpretation based on the result of action *in situ*, which has been since formulated by Taramelli. The Ophiolithic groups of Liguria, treated of in the two succeeding essays, are similarly thought by the author to have emerged *in situ*. The paper entitled "Carrara, Massa, and Versilia District," furnishes reading of interest even to those who are not acquainted with the region. In his account of the Permian and Triassic Belt of the Tuscan Subapennines the author states again his belief that the overthrust theory applied to the district by Steinmann is unnecessary. Two more papers are devoted to the Ophiolithic and Volcanic Groups of rocks of the Tuscan Subapennines, and the series terminates with an essay on the leading geological and petrological features of Elba, in which Termier's overthrust theory is fully discussed.

An index of authors quoted greatly facilitates reference to the numerous bibliographical quotations which contribute to make of the volume an indispensable text-book of Italian mountain geology, and one which contains also much that is of interest to the geographer.

The Botany of Iceland. Edited by L. Kolderup Rosenvinge, Ph.D., and Eugene Warming, Ph.D., Sc.D. Part II. Copenhagen: J. Frimodt. London: John Wheeldon and Co., 1918.

In Vol. xxxi. p. 254, we published a short article on the first part of this monograph, which contained an interesting account of the physical geography of Iceland. The present part is almost wholly technical in nature, containing as it does an article on the Marine Diatoms found off the coasts of Iceland, and a long account of the Bryophytes (Mosses) of the island. This second section, however, contains a number of plates, some of which give striking representations of Icelandic scenery, and on this account attention may be called to the volume here. In the course of his descriptions of the mosses found round the hot springs, also, the author, Mr. Aug. Hesselbo, gives some useful notes on the characters of these. He emphasises the important part which mosses and their relatives play in the flora of Iceland, but does not in his text touch directly upon any geographical subjects.

A Brief Survey of the Political Development of Europe. By F. Waterton, B.A. (Lond.). London: Henry J. Drane, 1918. *Price* 2*s.* 6*d. net.*

This is a capital little book, which we recommend cordially to the notice of our readers. It is described in the preface as an elementary treatise on the evolution of political theory, aiming especially at supplying a brief outline of the growth of nationality in Europe. Thus though historical in outlook and presentation it touches geography from several sides. There is, for example, an admirable, though very brief, account of the Industrial and Agrarian "Revolutions" in Britain which the geographical teacher might usefully employ to supplement his own special treatment. The book contains an index, but we would suggest that in any later addition a list of books of reference might be added.

AMERICA.

Homesteading: Two Prairie Seasons. By Edward West. With 32 illustrations. London: T. Fisher Unwin, 1918. *Price* 10*s.* 6*d. net.*

As one of the reasons for writing this interesting book, the author states "that, when blessed peace comes again, there will probably be a flood of emigration Westward, as was the case after the Franco-German War of 1871," and

that, while there are plenty of books dealing with the history and rapid growth of Canada, there are few giving, like the present one, details of the actual life of an emigrant there, written from the author's own experience of it. The author represents himself and an emigrant friend looking for a "homestead" in the Saskatchewan district, and their conversation greatly enlivens the book. They went to a Land Office in Saskatchewan on arrival from England, and were shown "maps on which were indicated large numbers of homesteads open for entry, as it is called, in various parts of the district," said homesteads being known by such cryptic titles as "'S.W. quarter of 47. II. W. of Third,' according to their position on the map."

As oxen were cheaper than horses and did not require oats, our emigrants, being poor, bought a pair for $180 cash, including harness. Then they purchased a wagon for $50, and a walking 12-inch plough for $8, after which they began a hunt for homesteads. At last they each located a homestead, although some five miles apart, one for stocking, and the other for wheat. After this, they had to "break the prairie," a toilsome job of 70 acres, and to build their "shack" or house. A terrific thunderstorm, common on the prairies, interrupted the work, but it was finished at last for "hay time." Unfortunately a bad harvest was caused by frost, and our emigrants had to go South "to look for shocking or stacking work," as servants of others. One of them was engaged at $2 and the other (with ox team) at $3½ per day. Afterwards they moved elsewhere and got for both, with team, $5 per day. The "threshing meals" were attended by men of various nationalities—Britons, Americans, a French Canadian, two Galicians, a Russian, and a German. The coming of winter brought a "freeze up," with the advantage that "meat can be frozen and will keep for months," for "the temperature would not rise above freezing-point probably for months," while 30° to 50° below zero (Fahrenheit) are not uncommon.

In his chapter entitled "Women on the Prairie," the author discusses a subject for which he considers the Canadian authorities have not as yet made due provision. He says, "the ideal of the Canadian Government seems to be a vast number of men owning small farms, with wives of the latter class, and yet they have made no adequate provision for such. In all communities whose Governments claim to be at all up to date, the care of mothers and children, and what is called Eugenics, is receiving more and more attention; but the Canadian Government, while receiving a splendid influx of new life from the older countries, would seem to consider that the gift of 160 acres of land covers a multitude of omissions in this respect. Terrible stories of hardship and suffering could be multiplied over and over again, and readers who wish to know more on this point may be referred to an interesting tale called *A White Passion*, by A. Teetgen (published by Wells Gardner, Darton and Co., Ltd., London)." Again, "Though the predominant population is composed of young men 'baching' (that is living and cooking for themselves in shacks), yet a considerable number of what may be described as well-brought-up young women, and some from homes of refinement and education in the Motherland, follow the men of their choice to the Prairie country. Now this is a class of woman that Canada stands sorely in need of, though the Canadian worshipper of the Goddess of Getting On may not realise the fact. It is true that a considerable number of single women find employment in the towns who shrink from becoming wives and mothers on the prairie under present conditions: and, without attempting to go into details or elaborate the question, the thoughtful reader will easily perceive that such a state of things is not a healthy one for the future of the growing young nation."

Chapters on grain-hauling and shipping, horse and stock raising, and a good harvest, complete, with others, one of the most thoroughly practical and readable volumes on the Canadian West which has ever been written.

GENERAL.

The Statesman's Year Book: Statistical and Historical Annual of the States of the World for the Year 1918. Edited by Sir JOHN SCOTT KELTIE, LL.D., assisted by M. EPSTEIN, M.A., Ph.D. Fifty-fifth Annual Publication. London: Macmillan and Co., 1918. *Price* 18*s. net.*

In this preface the editors of this volume speak of the continued difficulties which beset its preparation under war conditions, and indicate that the need of withholding information on certain points, and its paucity and unreliability in other cases, especially as regards Russia, are not the least of these difficulties. The method adopted in regard to the latter problem has been to place much of the information available in the section entitled "Additions and Corrections." Thus it is here, and not in the text proper, that we find an account of the Ukraine and of the other apparently separate states into which the Empire has broken up. No one who has had any experience, however small, of the work of editing, can fail to sympathise with Sir John Scott Keltie and his assistants in their war-time difficulties, or refuse a tribute of gratitude and admiration of the way in which they have met them.

Apart from the special features due directly to the war, we may draw attention to the exceedingly valuable map, prepared by Messrs. Bartholomew, showing the world's food supply in 1913, and presenting all the essential facts with admirable clearness and simplicity. From these presented we select the following as profoundly significant at the moment. In 1913 Russia stood third in the list of food-exporting countries, the order for values being the following, where the figures represent millions sterling: United States, 99, Argentine, 90, Russia, 86. In the same year, the food production of Russia, as expressed in a percentage of requirements, was 110 per cent., as against 100 per cent. for the United States, and 148 per cent. for the Argentine. In the same year Austria-Hungary produced 98 per cent. of the food she required. In the last country food conditions are now stated to be very bad. Even more striking, from the world point of view, is the fact that Russia's surplus has disappeared, and that the new Russian States can apparently no longer even feed themselves. The facts seem to suggest that there may be a world shortage of food products for long after peace comes, and that the political upheaval in Russia, with the resultant partial collapse both of industry and of agriculture, is far from being a purely Russian problem.

We note, as another important feature of the volume, that the lists of books on the war, which appeared in previous issues, have been supplemented by another classified list, which is both comprehensive and catholic.

BOOKS RECEIVED.

The War and the Coming Peace. By MORRIS JASTROW, Jr. Crown 8vo. Pp. 144. London: J. B. Lippincott Co., 1918. *Price* $1.00 *net.*

The Virgin Islands of the United States of America. By LUTHER K. ZABRISKIE, formerly Vice-Consul of the United States of America at St. Thomas. 109 Illustrations and 2 Maps. Demy 8vo. Pp. xvii + 339. London: G. P. Putnam's Sons, 1918. *Price* 20*s.*

Our Allies and Enemies in the Near East. By JEAN VICTOR BATES. Demy 8vo. Pp. viii + 226. London: Chapman and Hall, 1918.

The Processes of History. By FREDERICK J. TEGGART, Ph.D. Crown 8vo. Pp. ix + 162. London: Humphrey Milford, 1918. *Price 5s. 6d. net.*

Geography of the World's Agriculture. By V. C. FINCH and O. E. BAKER. With Maps and Figures. Royal 4to. Pp. 149. Washington: United States Department of Agriculture, 1917.

Handbook of Travel. Prepared by THE HARVARD TRAVELLERS' CLUB. Crown 8vo. Pp. 544. Cambridge: Harvard University Press, 1917.

La Dobrogea. By N. P. COMNÈNE. With Maps. Crown 8vo. Pp. 207. Paris: Payot et Cie., 1918. *Price 3 fr.*

The Diary of Ananda Ranga Pillai. Translated from the Tamil by order of the Government of Madras. Edited by H. DODWELL, M.A. Vol. VI. Demy 8vo. Pp. xviii + 466. Madras, 1918. *Price 5s. 6d.*

The Arab of Mesopotamia. Pp. 1-100. *Asiatic Turkey.* By GERTRUDE L. BELL. Pp. 107-202. Foolscap 8vo. Basrah: Superintendent Government Press, 1918. *Price Re. 1.*

War and Revolution in Russia. By JOHN POLLOCK. Crown 8vo. Pp. xviii + 220. London: Constable and Co., 1918. *Price 6s. net.*

The Desert Campaigns. By W. T. MASSEY. With Map and Illustrations from Drawings by JAMES M'BEY. Crown 8vo. Pp. xvi + 171. London: Constable and Co., 1918. *Price 6s. net.*

The Strategic Geography of the Great Powers. By VAUGHAN CORNISH, D.Sc. With Coloured Maps. Crown 8vo. Pp. viii + 114. London: George Philip and Son, Ltd., 1918. *Price 2s. net.*

South America: An Industrial and Commercial Field. By W. H. KOEBEL. With 23 Illustrations. Demy 8vo. Pp. 359. London: T. Fisher Unwin, Ltd., 1918. *Price 18s. net.*

Unité Ethnique et Nationale des Yougoslaves. By JOVAN CVIJIĆ. Reprinted from *Scientia*, vol. xxiii. 12ème Année (1918), N. lxxiv-6. London: Williams and Norgate.

Cesare Battisti, Geografo-Martire. By Prof. MARIO BARATTA. Novara: Istituto Geografico de Agostini, 1918.

Svenska Turistföreningen Årsskrift, 1918. Stockholm: Wallström and Widstrand, 1918.

Statistical Abstract for the United Kingdom in each of the last Fifteen Years from 1902 to 1916. 64th Number. London, 1918. *Price 1s. 9d. net.*

Report on the Administration of the Madras Presidency during the Year 1916-17. Madras, 1917. *Price 3s. 9d.*

Board of Agriculture for Scotland: Agricultural Statistics. 1915: Vol. iv. Part iii. 1916: Vol. v. Part i. Edinburgh, 1918. *Price 3d. net.*

Commonwealth Bureau of Census and Statistics: Trade and Customs and Excise Revenue of the Commonwealth of Australia for the Year 1916-17. By G. H. KNIBBS. Melbourne, 1918.

Survey of India: General Report, 1916-17. Prepared under the direction of Col. Sir S. G. BURRARD, K.C.S.I., R.E., F.R.S. Calcutta, 1917. *Price 2s. 8d.*

Colonial Reports (Annual).—Gilbert and Ellice Islands (958); Cayman Islands (Jamaica) (959); Bermuda (960); Mauritius (961).

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

FACSIMILE OF THE MAP OF SCOTLAND BY HENRICUS NAGEL (*circ.* 1595),
in the possession of the Royal Scottish Geographical Society.

This Map is an artistic curiosity rather than a good Map of the period. It is evidently copied from Ortelius' Map of Scotland, as Perth is omitted—a noticeable feature in Ortelius' Map; while the Island of Arran has been left out.

Scotiæ Tabula
Vararis æstus
Murray fyrth
Oceanus Deucaledonius
Septentrio
Oriens
Germaniæ pars
Aberdora
Dundrage
Tyer
Fynlator
Sydgate
Elgyr
Burnetkirk
Petterpolle
Newhal
Ethylorth
Dunbar
Durnet
Fordhern
Hamilton
Hamfordt
Dalkeith
Edenburgh
Lithquo
Striuelyn
Dumay
Latherne
Barrisdale
Dornoch
Brora
Helmsdale
Forsnar
Halodayle
Armydale
Strathy
Ferne
Tornegar
Dyngual
Beaulyn
Rosse
Petty
Badenoch
Grampius mons
Grantzbain
Nelland
Murray
Rosse
Sutherland
Strathnaver
Assynshyre
Beane
Rosse
Zelt
Ouæ prius
Aqua
Fluuius
Lochaber
Lochtay
Lochern
Lochenz
Lochtrey
Lochbrand
Lochbrie
Lochdrum
Lochneyse
Lochlarg
Lochlouthre
Lochmaly
Lochkenard
Lochmarr
Lochtarf
Lochkillen
Lochlaxford
Lochbroom
Lochkanard
Lochmarr
Lochtarf
Lochkillen
Lochlaxford
Lochbroom

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

TRAVEL MEMORIES.[1]

By Lieut.-Colonel A. C. Yate, F.R.G.S., F.R.Hist.Soc.

(With Illustrations.)

The concluding pages of the paper which I contributed to the August number of this Magazine described what a great British Missionary Society was doing in 1881 to ameliorate the conditions of life of the Armenians located at Julfa, a suburb of Ispahan. To-day, the 20th September 1918, the memory, not only of the earnest purpose which I saw devotedly exemplified at Julfa 37 years ago, but also of decades of British sympathy with and effort on behalf of the persecuted Armenians is eclipsed and darkened by the gloom of a headline—"Baku evacuated. Armenian treachery to British."

The smartness of the silent blow launched out from Baghdad and landed at Baku had justly stirred our pride. Events of the war have evoked two schools of strategy in Britain: that which pins its faith on the Western Front alone, and that which advocates the double Front Western and Eastern. I strongly incline to the latter.

When about a year ago Bolshevist Russia and the chief army commands of the Central Powers concluded an armistice, the evacuation of Persian territory by both Russian and Turkish troops was provided for, "the freedom and independence and territorial inviolability of the neutral portion of the Persian Empire being guaranteed," and arrangements "for the establishment of other necessary measures" being foreshadowed. Past memories, as told in Morgan Shuster's *Strangling of Persia*, and Professor E. G. Browne's *Reign of Terror in Tabriz*, and reminiscent of Herr von Henting's two years' mission from Constantinople to Persia, Afghanistan, China, and Turkestan, and also of the treachery of the Swede-officered Persian Constabulary, indicate the line which

[1] Continued from p. 307.

Turco-German intrigue and force would follow. Curiously enough, Mr. Athelstan Riley's prediction of British troops garrisoning Tabriz, which at the time it was made, viz. August 1917,[1] seemed most improbable, might have come within a measurable distance (200 miles) of being fulfilled, had the Georgians, Armenians, and anti-Bolshevists of the Caucasus met General Sir Frederick Marshall's contingent in that spirit which the enterprise that despatched it merited. From the Caucasus communication might have been opened up with the Cossacks of the Don, Terek, and Kuban, with General Alexeieff, and with the Czecho-Slovaks and anti-Bolshevist Russians of the Volga; and thus, pending the arrival of support from Eastern Siberia, the Turkish, German, and Bolshevist forces, along a front extending from Azerbaijan to Kazan on the Upper Volga, might have been held in check. Persia has arrogantly repudiated the Anglo-Russian agreement of 1907, though, without British aid, she would at this moment have been a simple playground for Turks and Germans. *ὕβρις* has ever drawn down upon itself the anger of the gods, and, methinks, Persia has not yet drained the cup of bitterness down to the very dregs. And yet an inscrutable Providence interposes, and the instrument of that Providence was—Ferdinand of Bulgaria, one of the *âmes damnées* of this great war. Persia has much to answer for, but the famine scenes reported from Kirmanshah (*Blackwood*, Sept. 1918) and from Teheran (Mission Reports) move us to more than pity. They are painful—nay more, heartrending.

Let those who will pooh-pooh the issues of the great battle on the "Eastern Front," extending from Murmansk and Archangel to the Red Sea. That long line confronts vast Pan-German ambitions, embracing the command of trade routes, *via* Syria and the Caspian region, to the Far East, menacing India through Persia and Afghanistan, planning a through railway and steamship route, *via* Baghdad-Karachi-Colombo, to Australasia (15 days from Berlin to Port Darwin), and, finally, communication by rail, *via* Aleppo and Cairo, with Eastern and Central Africa. It has been publicly stated by an Englishman long resident at Aleppo, that, when the present war broke out, 500 tons of dynamite were stored ready at Alexandretta, expressly for the purpose of blowing up the Suez Canal. This fact reminds us of the debt we owe to those who repelled all the Turkish attacks on the Canal in the early days of the war. The Caspian region is one link in our "Eastern Front"; and better for the Allies and better for all those who war against Pan-Germanism, Pan-Turanianism, and Bolshevism would it have been had the Armenians "played the game" at Baku. It is curious to reflect that *three Englishmen*, Anthony Jenkinson (16th century), Christopher Burrough (17th), and John Elton (18th), opened up trade through Russia, *via* the Caspian, with Persia, and so in part paved the way for the Middle-Eastern policy of Russia.

The project of connecting Tashkent by rail with Omsk on the

[1] *Vide Morning Post* of 28th August 1917. Britain has now, as the issue of the Russian revolution, "taken on the whole of Persia," as Mr. Athelstan Riley prognosticated. And what is more, thanks to the Nushki-Mirjawa Railway, a British force, somewhere apparently between Ashkabad and Sarakhs, commands the Trans-Caspian Railway.

Siberian Railway would, had it been completed before this war, have made it possible to reinforce by that route the Allied power in the Trans-Caspian region and on the Caspian. Just 28 years ago I was spending a day with General Annenkoff, the constructor of the Trans-Caspian, and Prince Khilkoff, the constructor of the Trans-Siberian Railway, at Amu-Darya on the Oxus. What a change has come over the scene since then, when we sat at General Annenkoff's lunch-table, and partook of red and white wines and cognac, the produce of the General's own vineyards in Turkestan.

The Armenian defection seriously menaced our position and prestige in the East. The balance, happily and opportunely, is more than redressed by Allenby in Palestine and Franchet d'Esperey in Macedonia. The Turk will live to find that the German has goaded him to his ruin. Let Turkish Pan-Turanian ambition be what it may, Allenby and Marshall converging on Aleppo, Franchet d'Esperey dominating the Balkans, and the hoped-for resurrection of Russia will nip that ambition in the bud.

The vastness of the issues that depend upon the contest that is being waged now upon our "Eastern Front" has tempted me into this digression suggested by the racial link between the Armenians domiciled at Julfa under the Persian heel and the Armenians who, when men of Warwick, Stafford, and Worcester came to their aid, sacrificed British blood for nothing.[1] General Bicharakoff, a Cossack, is, it is understood, himself co-operating with the British troops in Azerbaijan, while north of the Caucasus Cossacks of the Don, Terek, Kuban, Ural, and of Orenburg, together with General Alexeieff's troops, are in readiness to effect a junction with any reinforcement that may come to their aid. We might have got the Caspian shipping completely into our hands, and what a power that would have been! With this "foreword," let me hark back to the Ispahan of 1881.

"On the evening of the 11th June we set off on horseback to visit the Minār-i-jumbān,[2] or the shaking minarets. The ride in itself was a real pleasure, for we wended our way through a series of narrow lanes shaded by trees and traversed by running streams. Now and again on either side we had a peep along charming vistas of wood and water. After leaving Julfa we crossed the river by an old and narrow stone bridge,[3] from whence we had a good view of the fine bridge that connects Julfa with Ispahan.[4] During this ride I witnessed a (to me) novel mode of threshing grain. The threshing-machine consisted of a wooden frame resting on fifteen small iron wheels, which served both as a locomotive medium and also for threshing out the grain. This machine was drawn by a donkey, driven by a boy sitting on the frame, round and round the threshing ground, in the centre of which lay a large mass of corn waiting to be threshed. Curiously enough, a day or two later, I

[1] *Vide Times*, 21st September 1918, "On the Road to Baku."

[2] *Vide* Curzon's *Persia*, vol. ii. p. 58, for a picture of this building.

[3] Presumably the "Pul-i-jhubi" mentioned in Curzon's *Persia*, vol. ii. p. 47.

[4] Bridge of Ali Verdi Khan. *Vide* Curzon's *Persia*, vol. ii. p. 56.

was looking through the illustrations in Ebers' *Egyptien*, and among them found an engraving of a similar machine. Thence traversing for several miles picturesque lanes such as I have just described, we reached an insignificant mosque, above the dome of which rose two small minarets. Entering the courtyard of the mosque, we mounted to the roof, and at our request a menial of the mosque ascended one of the minarets and proceeded to shake it. These minarets are of very small diameter, and of no great height, and are ascended by a very narrow winding staircase within them. That they shake cannot be denied, but that such a fact should be considered in any way extraordinary is sur-

The Pul-i-Khāju at Ispahan. From a photograph taken about 1890, in possession of Mr. B. W. Stainton.

prising. A tall, narrow, and hollow pillar of light construction would naturally sway and quiver slightly when the power and weight of a man is set in motion at the top of it; and that this motion is imparted to the other minaret is only natural, for the motion is communicated to it through the intermediate brickwork of the mosque. The custom of shaking these minarets for the edification of visitors has caused small fissures to open at their bases. One obtains from this mosque a good view of the Ispahan city and its cultivated valley, and also the encircling mountain ridges. To the west, at a distance of two or three miles, a rocky hill, crowned by ancient buildings, attracts the eye. These buildings are known as *Ātish-gāh*,[5] and are reputed to be the ruins of a

[1] *Vide* illustration at p. 112 of *Scottish Geographical Magazine* for March 1918.

temple of the Zoroastrian worship. We unfortunately had no time to visit this spot. Beyond it stretches the richly watered and wooded valley of the Zendeh Rud.

"On our return we went to dine with Mr. Höltzer, the telegraph superintendent. I met at this dinner a singularly heterogeneous party, both as regards nationality and language. The company consisted of one English and two Armenian ladies, two Germans, three Englishmen, an Armenian Roman Catholic priest, and the British Agent (Wakil-ud-daulat), also Armenian. Persian, Armenian, English, French, and German were used as mediums of conversation. The Armenian ladies could speak only Persian and Armenian. English was, of course, the language generally spoken, but I conversed in French with the Roman Catholic priest, and he conversed mostly in German with Mr. Höltzer and Dr. Hörnle. The dinner itself was a curiosity. The courses consisted of soup, leg of mutton, roast turkey, curry, pudding, and dessert. However, we did not fail to do justice to it, as also to the excellent Persian wines that washed it down. The best wine in Ispahan was said to repose in the cellar of the British Agent; but I regret to say the 'black wine of Ispahan,' of which we heard such glowing accounts, never moistened our lips during our stay in Persia's ancient capital.

"On the morning of the 12th we paid visits to the Cathedral and several of the parish churches, and also called on the Armenian Bishop. The Cathedral is a small edifice, but its interior is well worth a visit. Entering the courtyard, one sees a belfry supported on four solid stone pillars, under which is the tomb of an Armenian officer who rose to eminence in the Persian service. Of the exterior appearance of all the Armenian churches in Julfa one may briefly remark that they are not worth looking at, and most of them wear an air of disrepair.

"Entering the Cathedral, we found ourselves in a passage separated by a screen from the main body of the church. The walls of this passage are decorated with numerous paintings, among which two frescoes (subject unknown) are deserving of attention. Following through this passage the visitor enters a second courtyard, off which lies the Bishop's palace or residence. However, we will first enter and inspect the Cathedral. Passing through a door in the screen, we enter the body of the church. There is nothing of grandeur about it; from an architectural point of view it is simply insignificant. In general internal appearance Armenian churches bear a resemblance to Roman Catholic and Russian churches, a resemblance due to the profusion of painting. The beauty and grandeur of English religious edifices lies in their architecture, whereas in the churches and cathedrals of countries which regard St. Peter's or St. Sophia as their Mecca the attention is partially, and in some cases mainly (as in the churches of the Kremlin at Moscow) attracted by the magnificence of the paintings, frescoes, and metallic work. In Armenian churches there is little except the pictorial decorations worthy of notice, and even they possess but indifferent merit. Still, they are curious and interesting. The Cathedral of Julfa, from the apex of the dome almost to the floor, was attired in frescoes. A dado of

painted tiles about four feet high ran round the four walls of the building. The frescoes depicted the Biblical history of the world. Commencing with the legend of Adam and Eve in the dome, the series of frescoes descended tier after tier, representing the main incidents in the careers of Noah, Abraham, Moses, and Christ, terminating with the lives of the Apostles and Saints. In particular, the life and sufferings of St. Gregory, the first Armenian patriarch, were the theme of numerous designs. In point of perspective and artistic rendering the defects of these frescoes were only too apparent. The decorations of the dome in gold arabesque work were decidedly handsome. I remarked three reading-desks of solid silver, and on them lay three copies of the Scriptures, with covers of solid silver. The floor was carpeted with magnificent Persian carpets, many of them evidently made at a time when thorough good work was put into them. The introduction of aniline dyes is said to have materially detracted from the value and excellence of Persian carpets. In fact, from what I heard both at Kandahar and in Persia, the carpets made by the Turkomans are now generally acknowledged to command the highest market value.[1] The altar or chancel is slightly raised above and separated by a railing from the body of the Cathedral. Under a canopy stands the Bishop's Chair, facing towards the altar. Leaving the Cathedral we went to call on the Bishop, and were led up a flight of stairs into a large room (40 or 50 feet long), hung with paintings of the Twelve Apostles, and a great number of good engravings representing Scriptural events. Then the Bishop, attended by a monk, received us very courteously. He was a man rather above the middle age, and of prepossessing appearance. We conversed in Persian with him on Afghan affairs, British and Russian policy and projects, their political mistakes, and their respective wealth and warlike resources. When cherry *sharbat* and the inevitable *kaliyūn* had been circulated, we took our leave, and paid a visit to several other churches, which generally resembled both internally and externally the Cathedral, but without its look of prosperity and careful preservation. In the Cathedral courtyard lie buried a number of Britons. It is something in favour of the Armenian Church that they should have permitted the burial of Christians of another sect within the precincts of the churches. I have already mentioned the number of British and European subjects who lie buried in the Armenian churchyard at Bushire.[2] Armenians of rank also are buried in the churchyards, but the majority of the Armenian populace lie buried outside the walls of Julfa. I regretted being unable to attend an Armenian service.

"During our morning peregrinations we passed through the central

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[1] This estimate has been confirmed by time; and of that the market value of the several carpets is the best criterion.

[2] Of Britons who lie buried in Armenian cemeteries in Persia, Sir Henry Lindsay-Bethune, Bart., of Kilconquhar, *de jure* 9th Earl of Lindsay and 18th Lord Lindsay of the Byres, has few, if any, rivals in point of interest and romance. Of his splendid physique I have already spoken. In that Sir John M'Neill (Envoy at Teheran, 1836-42), who, however, died at Cannes, fairly vied with him; but the palm in romance rests with Sir Henry, of whom I hope to say more later. Both were Scots of whom Scots, I ween, are proud.

market, where large supplies of meat, bread, fruit, vegetables, sweetmeats, etc., were exposed for sale.[1]

"On the evening of the 12th June we paid one or two visits to the members of the European fraternity resident in Julfa, and afterwards walked as far as the bridge named after Allah-vardi Khan, a distance of about 1½ miles. The old telegraph office, a fine building that has evidently seen better days, and was doubtless the residence of some Persian family of rank and wealth, lies a few hundred yards south of this bridge. A fine old avenue of chinār (plane) trees, now utterly neglected, runs southward of the bridge, in continuation of the avenue which leads northward from the bridge to the city of Ispahan. The bridge of Allah-vardi Khan is a fine structure, standing on arches of solid brickwork. Its roadway is flanked on either side by brick buildings of such height and breadth as to admit of arches and chambers being constructed within them. Whether these structures are merely ornamental or intended for practical use I cannot say.

"On the morning of the 13th June we set out to call upon the Zill-es-Sultan, the eldest son of the Shah Nāsir-ud-din, and Governor of Ispahan and Fars. The second son of the Shah is Wali-'ahd (heir-apparent) and Governor of Tabriz. Crossing the river by the Pul-i-Allah-vardi Khan, we passed up a fine stone-paved avenue,[2] lined with double rows of magnificent chinar-trees on either side. The outer rows contain trees evidently of great age. In fact, this avenue was made in the reign of Shah Abbās-i-buzurg. The inner rows of trees are also not far from one hundred years old. Down the centre of the raised and paved roadway runs a watercourse (now dry), and at intervals one passes a succession of tanks (also dry). Off the avenue open a number of fine old gateways, decorated with painting and tile-work, and leading into the private gardens that flank each side of the avenue, but screened by high walls. About half-way up, on the right, stands the chief Madrasa,[3] or College of Ispahan. Its massive wooden gates (folding-doors) are studded with massive ornaments of silver-gilt, not a few portions of which, however, have been seemingly stolen or made away with in some way. Just within the gateway under the arch are the shops of several 'bakkāls,' or provision dealers, and also a tea-shop in which a fine assortment of Persian porcelain and stone or earthenware is exposed for sale. Passing these we find ourselves in a large court shaded by magnificent chinar-trees, the walls of the surrounding buildings being inlaid with the finest designs in tilework that I saw in Persia. On the south side stands a striking mosque, the dome and muazzin-tower of which are overlaid with blue tiles (displaying, however, many signs of the effects of the hand of time and of neglect), while the lower part of its walls are faced with a yellow marble, which forms part of the decorations in most of the important public edifices in Ispahan. We were not permitted to enter this mosque,

[1] To-day bare counters stare the starving people in the face.

[2] The "Chahār-Bāgh." *Vide* illustrations in August number, p. 304.

[3] *Vide* illustration in August number, p. 304.

but the glimpse that we obtained through the doorway left no doubt that its internal decorations were of no common order. Leaving this 'Madrasa' we rode up the avenue for some distance till we reached the gateway at its termination on the city side, then turning to the right we traversed a road of no great length, and reached the gate forming the entrance to the Chihal-Sitūn Palace, and through it to the residence of the Zill-es-Sultan. We found a padlocked iron chain closing the passage through this gate, and a guard posted over it, and were informed that the orders were that no vehicles or horses should enter. We were perforce bound to dismount, and, leaving our horses outside, we first made our way past the Chihal-Sitūn to make our call upon the Zill-es-Sultan at his palace in the south-east corner of the square—a building that goes by the name of 'Sar-pūshīda,' or 'light under a bushel' ('Hidden Head' is the literal translation). Reaching the entrance we found several sentries and 'khwājas' hanging about. One of the latter conducted us through several courtyards, till we met one of the officials, in immediate attendance on His Royal Highness, who conducted us into a capacious chamber containing a large tank filled with pure clear water, the very sight of which, after our hot ride, inspired us with a longing to strip off our best attire and plunge in amid the gold and silver fish that seemed to luxuriate so blissfully in its crystal depths. Miniature fountains spouted upwards in sparkling jets from its surface towards a handsome roof painted with hunting and other scenes, and supported on pillars cased in moulded plaster-work. Off this tank, around which ran a narrow paved walk, opened several chambers, the walls of which were mostly covered with decorative designs in mirror-glass, a mode of decoration seemingly very fashionable in the private rooms of Persians of rank and wealth. I remarked also not a few pictures by European artists, Japanese and Chinese vases, and other articles of vertu that suggested that their owner was not without some artistic taste. Shortly after our introduction into this locality the Prince entered, and bowed to us in answer to our salutations with princely condescension. He remained standing during our visit—indeed, there were no seats visible.[1] The conversation was chiefly carried on through the Wakil-ud-daulat—for our knowledge of Persian was at that time far from equal to the requirements of the occasion. The study of French had at that time made some progress in India, but His Royal Highness's proficiency in it did not amount to conversing with ease. Our conversation therefore continued in Persian, the subject being Afghan politics and affairs, and the Central Asian policy of England and Russia. As far as I could judge from my imperfect comprehension of his remarks, his tendencies were in favour of Russia; and after what we heard subsequently at Teheran of the para-

[1] The Persians of rank are now quite accustomed to the use of chairs, and generally offer them to their visitors, if European—although in their own private life they adhere to their own method of squatting on a carpet or costly mattress. There is as much, if not more, etiquette in attitudes of sitting among the Persians than among us. In any formal social meeting or official assemblage no Oriental would think of sitting otherwise than with his legs folded decorously under him or tailor-fashion.

mount influence of Russia with the Shah, this is not to be wondered at. He appeared to entertain misgivings also as to our policy in abandoning Kandahar, and to attribute that policy to our inability to occupy it with

Portrait of the Zill-es-Sultan (eldest son of Násir-ed-din Shah), with his autograph in lower left-hand corner; taken at Vienna of recent years.
Original in possession of Mr. B. W. Stainton.

a military force. The conversation then took a more personal turn. He desired to know our rank in the British Army, remarked on our fraternal resemblance, inquired our ages, and then asked us to guess his. In reality he looks about thirty-five, and is very well advanced on the road to obesity. However, we thought it advisable to mention an age

considerably below that which we knew it must really be. Thereupon he remarked that we would doubtless be surprised to hear that he was shortly to become a grandfather, as one of his daughters was expecting her confinement. The Zill-es-Sultan wore the simple dress of a Persian gentleman without any decoration. He told us he had a great desire to visit Europe, and especially England, but that he feared that the sight of all its beauties and luxuries would make him discontented with his own country. One could not but indulge a hope that some experience of the more able and equitable administration of European nations might incite him to introduce many sorely needed reforms in his own realm, if ever he sits on the throne of Persia. Although the eldest son of the Shah, his mother is said to be not of royal birth—and for that reason the Shah's second son, whose mother was of princely family, has been chosen as the heir-apparent.[1] The latter does not appear to be popular, and is reputed to be completely under the influence of the Mullās. As the Zill-es-Sultan rules directly or indirectly a very large portion of the Persian kingdom, it seems exceedingly probable that he, on the demise of the Shah, will make a strenuous effort to gain the throne in the place of the present recognised heir, and the chances of his success are by no means small. Moreover, it seems to the advantage of British interests that such should be the case. For the present heir, who is Hākim of Tabriz, is in all probability more or less biassed in favour of Russia; whereas the Zill-es-Sultan, who has ruled provinces more accessible to British influence, may be expected to entertain views more favourable to British policy.[2] After coffee had been served in tiny porcelain cups resting in silver holders, we took our departure, and proceeded to see some of the other sights of Ispahan."[3]

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[1] I was informed that when the "Zill-es-Sultan" enters the room in which the "Wali-'ahd" is present, he is obliged to salute him respectfully, and to await his permission to sit down. My informant further added that there was no love lost between the brothers, and that the "Wali-'ahd" took advantage of his position so far as to treat the Zill-es-Sultan with but scant courtesy. The third son, "Nāib-us-Sultanah," is said to be the Shah's favourite.

[2] As events turned out, ten or twelve years after our visit, the Zill-es-Sultan, acting ill-advisedly, tendered to his father, Shah Nāsir-ud-din, his resignation of most of his governments. To his surprise the resignation was accepted. A few years later (in 1896) Nāsir-ud-din Shah was assassinated, and the Wali-'ahd came to the throne, and in due course was succeeded by his son, and he again by his youthful son, whose coronation took place in July 1914, just ten days before the present war commenced. In May 1916 the Zill-es-Sultan was in London. One of his sons, Prince Bahram, was a victim of the torpedoing of the *Sussex*.

[3] Extract from Diary of 1881.

PHYSIOGRAPHIC ANALOGIES BETWEEN SCOTLAND AND ITALY.

By C. S. Du Riche Preller, M.A., Ph.D., M.I.E.E., F.G.S., F.R.G.S., F.R.S.E.

(*With Illustrations.*)

I.

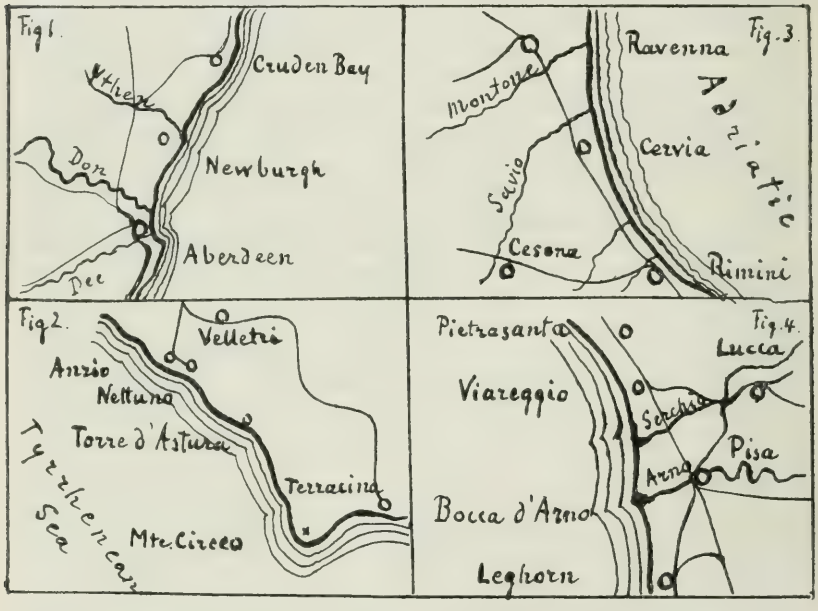
The analogy between the sandy curved coastline north of Aberdeen and the Anzio littoral south of Rome, which a fitful gleam of April sunshine suggested to Mr. F. W. Flattely (*vide Scottish Geographical Magazine*, October, p. 386), might be extended, *mutatis mutandis*, to several other stretches of the Italian coast, such as the Adriatic littoral from Ravenna to Rimini, and the Tuscan littoral from Pietrasanta (at the foot of the Carrara Mountains) to Viareggio, the mouth of the Arno near Pisa, and Leghorn. The four stretches, each about thirty miles in length, are shown in the small plans Figs. 1 to 4.

The difference between these northern and southern littorals in their effect upon the observer is essentially one of light and local colour, more especially at sundown: on the Aberdeenshire coast it is the wonderfully delicate, pale green transparency and the supreme serenity, on the Italian coast the incomparable purple glow and intensity of the atmosphere that pervades, dominates, and illumines the scene. Each effect has a beauty of its own, which in northern latitudes is enhanced by the contrast of the dark green, in southern latitudes by that of the azure expanse of the sea.

On the Anzio littoral the wonderful scenic effect is heightened by Monte Circeo, at its southern extremity, in connection with which and with Circe Mr. Flattely quotes Degli Uberti's beautiful lines. Monte Circeo, and the ancient city of Circei at its base, whose site is now occupied by the village of S. Felice Circeo, must have been ideal spots as Roman seaside resorts in the still salubrious days of the Pontine region, when Cicero lauded the villas of Circei—some of them imperial residences—as rivalling those of Antium. The promontory itself—twenty-seven miles south of Anzio and ten miles west of Terracina, is a limestone ridge four miles in length and one mile in width, covered with abundant and fragrant vegetation up to its summit, 1800 feet above sea-level. Its association with Circe rests upon the tradition that its name corresponds to that of the island of Aeaea—in Phœnician, "isle of the hawk"—to which that Grecian princess was banished by her father, Helios, in expiation of the murder of her husband, and that during her exile on the isle she became a famous sorceress. The contention that the Mount was no longer an island even in Homer's days is of no value, for even now it is surrounded by the sea on three sides, and must have been actually or virtually isolated from the shore when the latter was less silted up, and therefore much lower than its present level of

thirty feet above the sea.[1] Monte Argentario—north of Civitavecchia, with Orbetello at its base on the mainland,—presents a precisely similar phenomenon of a semi-detached island. With Virgil and other Roman poets *Circeius Mons* was an ancient Latium tradition as the abode of the enchantress, and, apart from other remains both on the ridge and at its base, an ancient paved platform on the summit marks the probable site of a temple dedicated to Venus or Circe, which crowned the imposing Mount and thus added classic to its exquisite natural beauty.

While the Anzio or Pontine littoral, among its many historic features, thus claims Monte Circeo, as the dwelling-place of Ulysses' enchantress, the littorals of Ravenna and of the Arno near Pisa recall two of the



FIGS. 1-4.—Sketch-map showing resemblance between the coast of Aberdeenshire (1) and parts of the Italian littoral (2, 3, 4).

most pathetic episodes (both of the year 1288) and some of the most famous passages in Dante's *Divina Commedia*.[2]

The first of these episodes, *i.e.* that of Paolo Malatesta and Francesca da Rimini, moves the poet to tender compassion :

> " Francesca, i tuoi martiri
> A lagrimar mi fanno tristo e pio " ;

The other episode, *i.e.* that of Count Ugolino of Pisa, arouses his wrathful indignation against that city for the crime of having, on a false

[1] Moreover, the Tyrrhenian littoral exhibits in many parts, notably in Tuscany, a tendency to a gradual raising of the beach, as is evidenced by the marine deposits—the so-called *panchina*—appearing above the sea-level.

[2] *Inferno*, v. 74 *et seq.* and xxxiii. 79 *et seq.*

charge of treason, starved that Guelph leader and his youthful sons and nephews to death. The punishment which Dante invokes upon it is a fine piece of poetico-geographical imagination: The two Tyrrhenian islands of Capraja and Gorgona—familiar and conspicuous objects seen from the Tuscan coast—are to move up to, and bar the mouth of the river Arno, whose waters shall be driven back to Pisa and drown every soul in the city:

> "Muovansi la Capraja e la Gorgona,
> E faccian siepe ad Arno in su la foce,
> Sì ch'egli annieghi in te ogni persona."

Besides this and many other historical associations, such as the final defeat of the Pisan fleet by the Genoese at Maloria opposite Leghorn in 1284, the littoral and former estuary of the Arno possess a monument of great antiquity in the basilica church of *San Piero in Grado*, about half a mile inland from the present silted-up beach. The church commemorates St. Peter's reputed landing in Italy at this spot, the tree close to which he is said to have first set foot being kept intact in its original place in the nave. Part of the church dates from the year 420; the basilica itself was built in the eleventh century, and is one of the most ancient churches in Italy.

II.

An analogy of a different kind between Scotland and Italy suggests itself in connection with Dr. F. Mort's interesting description of "The River Systems of South-West Scotland" (*Scottish Geographical Magazine*, October, p. 361). The remarkable physiographic changes in that part of Scotland, which covers about 160 square miles, are equalled, if not surpassed, by those in the Italian lake district from Lake Orta to Lakes Como and Lecco within a superficial area approximately the same. The district, comprising the five principal, more or less intercommunicating basins, is shown in the plan Fig. 5.[1]

As in South-West Scotland, so also in the Italian lake district the original flow of the main river-systems was north to south, in the latter case through the pre-glacial zonal estuaries or fjords into the Pliocene sea of the Po valley; but at the end of the last glaciation, *i.e.* during and after the final recession of the glaciers, only the rivers Ticino and Adda regained by re-erosion their original outlets at the southern ends of Lake Maggiore and Lake Lecco, while the drainage of all the other basins was reversed, and now flows south to north, ultimately reaching the Po valley only by indirect and devious courses. Thus, to mention only the larger lakes without the multitude of smaller ones, Lake Orta had its southern exit barred and its drainage reversed to the north through the Strona into the Toce, and thence into the Lake Maggiore basin. Similarly, the southern outlet of Lake Varese was cut off and the drainage diverted into Lake Maggiore through the Bardello. Again, Lake Lugano, which as a pre-glacial fjord drained by the two

[1] The plan does not include the basins of Lakes Iseo and Garda east of Lake Como, albeit they lie in the same subalpine zone and owe their origin to the same causes.

now extinct channels of Porlezza and Mendrizio into the Como basin, was severed from the latter, and had its drainage reversed into Lake Maggiore through the Tresa ravine, while Lake Como itself had its former direct exit to the Po valley barred, so that its drainage was reversed and now flows into the Lecco arm which has its outlet through the Adda and thence into the Po.

As I have shown elsewhere,[1] these and the innumerable minor physiographic changes throughout this extremely complex lake district,

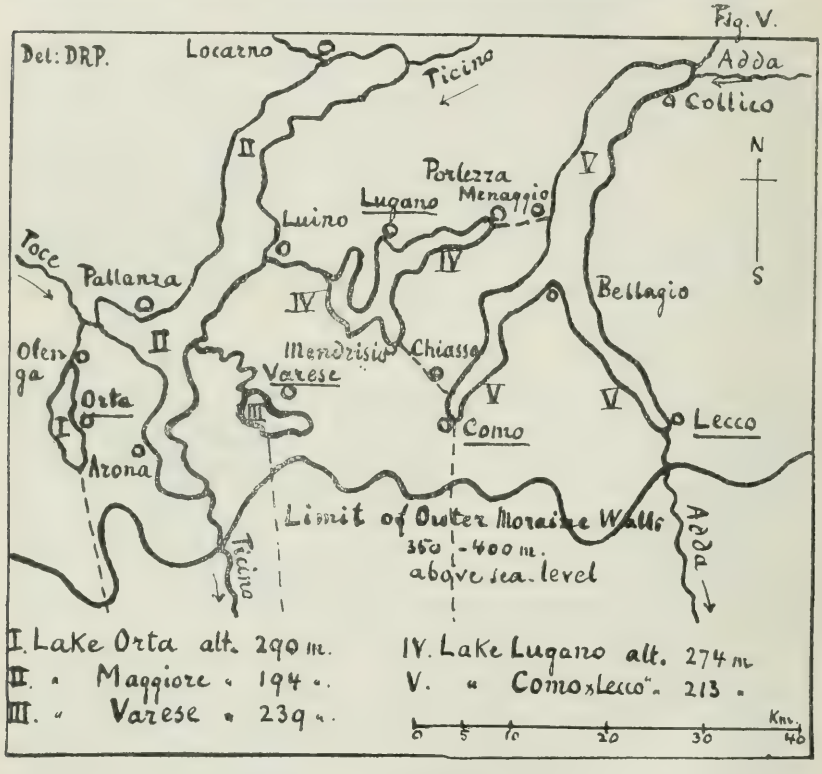


Fig. 5.—Sketch-map of the Italian lakes from Orta to Lecco.

by the original pre-glacial drainage channels being altered, cut-off, re-eroded, reversed, or permanently deflected and dried up, were brought about by three main and concurrent causes :—

(1) By a zonal flexure or settling along the base of the Alps consequent upon the last raising of that mountain chain in Tertiary times, the pre-glacial fjords and estuaries being, by that partial subsidence, lowered and converted to lake basins, which were gradually widened by fluviatile agency and denudation, indirectly also by the abrading and disintegrating action of glaciers.

[1] "The Moraine Walls and Lake Basins of Northern Italy," *Italian Mountain Geology*, part i. p. 1 *et seq.* 1918.

(2) By the moraine walls and enormous masses of glacial material deposited at the outlets of the former fjords and throughout the district by the receding glaciers in the course of repeated glaciations, the double and treble moraine walls along the base of the zonal lakes rising even now to 150 and 200 metres above the present lake levels.

(3) By the process of fluviatile re-erosion which set in during the interglacial periods, the stationary stages, and the final recession of the glaciers, and diverted many streams into entirely new channels, widened and deepened the lake basins, but only in the case of the Ticino and the Adda succeeded, by the increased volume of these rivers, in breaking through the moraine walls which barred the old outlets of Lake Maggiore and Lake Lecco.

In South-West Scotland, the extensive physiographic changes to which the river-systems were subjected are, as shown by Dr. Mort, due to potent and long-continued pre-glacial, *i.e.* purely fluviatile, erosion, in part to subsidence of the land, in part to glacial action. This warrants the conclusion that the lochs were formed essentially by the same agencies which, on a larger scale, were operative in the formation of the Italian lakes. Geologically, South-West Scotland, being almost entirely Silurian, is considerably older than the Italian lake district, where the age of the rock formations ranges from the Permo-carboniferous down to the Miocene and Pliocene, apart from the glacial and fluvio-glacial (*ceppo* and *ferretto*) conglomerates.[1] But as regards physical geography, the analogy between the two districts is strikingly interesting and instructive, and the evidence of the causes and effects of the physiographic changes is in both cases conclusive.

THE EFFECT OF GEOGRAPHICAL CONDITIONS ON AGRICULTURE.

By C. L. Walton, M.Sc. (University College of Wales, Aberystwyth).

Relations between Geography and Agriculture.—Between geography and agriculture an intimate relation naturally exists: how far such geographic control is absolute, and to what extent it may be modified by human action, it is the purpose of this paper to attempt to state. No two subjects have attained greater prominence and importance of late than these two closely related subjects, yet it would appear that their connection is at times inadequately recognised or taken for granted. There are innumerable references in the literature of agricul-

[1] Lake Maggiore, the ancient *Lacus Verbanus*, presents the important phenomenon that it lies in a trough at the contact line of Upper Palæozoic schists (west) and Mesozoic schists (east), the trough being the effect of the zonal flexure which affected all the Italian lake basins.

ture and geography, etc., illustrating practically all the phases, but there seem to be few definite attempts to co-ordinate these. Modern geography may, perhaps, be defined as "The study of distribution, with its causes and effects," and if this view of the subject be applied to agriculture (considered in its widest sense) it will be seen that we have a field that cannot be treated otherwise than in the very briefest manner in an article such as this, which must be taken as merely designed to draw attention to the great scope and interest of the subject.

It is obvious that, taken very broadly, agriculture is primarily conditioned by climatic factors. Considered in greater detail, we must next consider the topographic controls, and finally those known as economic. The type of agriculture in vogue, the distribution of crops and stock (and all other details) in any given area, must be the result of the interplay of this major set of factors, varying of course enormously in detail and importance in accordance with the degree of development of the cultivators. Let us summarise, broadly, the materials with which we have to deal, the overlap and interaction of whose distributions produce the differential phenomena we find in the world's agriculture (or for that matter, any portion thereof). They are:—I.- Climate (Climatology and Meteorology). II.—(*a*) Soil (Geology); (*b*) Plants (Botany); (*c*) Animals (Zoology); (*d*) Peoples (Anthropology).

The interplay of these mass factors produce the further set, namely, those known as—III. Economic; which may be considered as the product of the mutual interaction of mankind and his interference with, and use of, soils (and minerals), plants, and animals, the whole largely conditioned and controlled by climate. This brings us to a starting point, namely, the enormous significance of climate in relation to agriculture.

Climate and Agriculture.—Climate influences agriculture more than soils do; similar climates have similar vegetation the world over, but there is a wide difference between the products of similar soils in one climate and in another.[1] Man has, as yet, practically no control over climate; he can to some extent contrive and screen, and protect and circumvent; but he cannot alter this great and changeable set of controls "with the possible exception of the case of the pollution of the air of our large towns by smoke, no effort that man can make can influence the course of the weather."[2] Even the procession of the great seasonal movements, and their full significance and bearing on local weather (and hence on crop distribution and economic success or failure), are but now becoming clear, and, if understood by a few, are certainly little appreciated by the mass populations affected. Very interesting studies of the problems of agricultural meteorology have recently been published by Azzi.[3] He states that among the variations in the yield of crops, those caused by atmospheric changes hold first place, and considers that

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[1] Adams, C. C., *Commercial Geography*, p. 4. 1903.

[2] Lempfert, R. G. K., *Weather Science*, p. 1.

[3] Azzi, G. :—(*a*) *Boll. del Ministero di Agric. Indust. e Commercio.* Series B. Rome, 1916; (*b*) *Boll. bimensuale della Soc. Meteorol. Italiana.* Series iii., vol. 36. Turin, 1917. (Abstract *Internat. Rev. Sci. and Prac. Agri.*, Rome, March, 1918.)

for any district a study is required of (1) the critical periods in the growth of the various crops; (2) phenological maps, that is, maps on which are marked the dates on which (for cereals for instance) germination, earing, flowering, and ripening take place, thus gaining knowledge of the various zones; (3) weather charts. By comparing these and applying the resultant knowledge, it is claimed that, if the crops cannot be adapted to the weather, it is possible to adapt them to the climate, which represents the average weather, expressed as a series of percentages of probability of frost, drought, storms, cloud, etc., and an exact idea of the real productivity of a species in a given district can be determined.

The climatic control of agriculture is mainly directly through heat, frost, and rainfall, these being largely determined by prevailing winds, which are in turn governed by the seasonal movements of the great cyclonic and anticyclonic centres, by the relation of sea and land masses to one another, and by latitude. Leaving any discussion of these matters to their respective exponents, and accepting them as at present generally stated, we find that the world's agriculture roughly falls into a certain sequence governed by certain major factors; this sequence being counted from the north to the equator, and to a considerable extent again repeated southwards. The zones are:—(1) The Polar belt. Cold dominant with inhibition of agriculture proper. (2) Cold still dominant, and in consequence agriculture governed by the necessity for providing stores, harvested in summer, in order to carry on during the winter. (3) A series of regions in which agricultural operations can be carried on practically all the year round. Large harvest operations are here chiefly for export rather than for provision for winter; warmth and rainfall are more or less predominant, and, owing to drought, agricultural operations occur in winter rather than in summer; rainfall is very important; there is often a regular and predicable alternation of sun and rain, a great help for cultivation. (5) Desert belt, entirely governed by superabundant heat and lack of rainfall. (6) Equatorial belt. Constant heat counterbalanced by equally constant rainfall; storage of products needful locally to tide over dominant wet periods; harvesting by drying not possible, as in (2), (3), etc.

These divisions are practically identical with those of Herbertson,[1] who also subsequently put forward another and more detailed division,[2] based on the five chief types of vegetation, viz. forest, park, grass, scrub, and desert, but this, while of great interest, is too detailed to give here. Whether the above be taken, or Supan's rainfall belts or other classifications be used, they can but serve to bring out the existence of certain broad climatic controls which of necessity largely condition the main agricultural activities and distributions within their spheres of influence. Modifying conditions of course enter, and prevent arbitrary demarcations to a large extent.

It is obvious that in Northern Europe the whole yearly round of the farmer is centred on preparation for the relatively short harvest

[1] Herbertson, H. J., "The Major Natural Regions," *Geographical Journal*, March 1905.

[2] *Idem*, "The Higher Units," *Scientia*, 1913.

period (often adverse even then) and the rapid gathering and protection of the crops, without which he cannot hope to carry on his operations profitably through the winter season. I have myself known farms that were inadequately provided with buildings for storage and housing, described as "summer farms," such places being low-rented and backward in consequence. Conversely, in the equatorial tropical rain belt harvesting by drying in the manner of the temperate zones is impossible except by artificial means and protections as adopted on modern plantations.

The effect of temperature is well shown by Ward.[1] "Climate has in a large way set apart certain great areas where agriculture may best be carried on. Similarly it has been determined that one area shall be adapted for grazing and another for forest"; again,[2] "A normal duration of a temperature of 50° for less than a month fixes well the polar limit of trees and the limits of agriculture. A temperature of 50° for four months marks the limit of the oak, and also closely coincides with the limit of wheat cultivation. North of the tree limit agriculture ceases and man's food is to be sought very largely in the sea"; further,[3] "Cereals are a winter crop in the regions of winter rains."

Examples such as the above could be multiplied. Climate having primarily determined the distribution of the great types of vegetation, and topography—largely through altitude and soil conditions—the local extent of these types, mankind exerts his influence upon them. "Given a supply of food, man can exist in practically all climates, it is only indirectly through the food supply that the number and modes of the life of the inhabitants of any region are regulated by climate; the intermediate agent is vegetation which responds to climate."[4]

Natural Vegetation and Cultivated Crops.—Man has always tended to destroy original conditions and replace them by increasingly complex types of cultivation, whether from the starting-point of gardener or grazier. Mankind thence moulds and determines in varying degrees the vegetation, and the animals consuming it, acting always under the influence of the already named controls—climatic, topographic, botanic, zoological, and economic—all in the distributional sense geographic, and all included equally in any broad consideration of agriculture. To determine correctly and exactly what factors have actually conditioned the agriculture of any given country, region, or even field, may be an extremely complex and difficult matter, involving great general and local knowledge; but a series of examples may be cited to illustrate to some extent the manner and sequence.

The distribution of crops may be first touched upon. Primarily we have the great and fundamental division into grass-land and cultivation; and further, What determines which land shall remain in grass either (1) permanently or (2) temporarily? Land must remain permanently under grass when it is unsuitable for either plough or spade, owing to such reasons as steepness of slope, altitude (climate

[1] Ward, R. de C., *Climate*, pp. 297-8. 1909.
[2] *Idem, op. cit.*, p. 28.
[3] *Idem, op. cit.*, p. 297.
[4] Dixon, H. N., *Climate and Weather.*

eliminating better crops), or remoteness (an economic condition which may change), adverse soil texture, or climatic reasons. Portions of the great natural grass-lands of the world tend to pass into cultivation as the above-mentioned condition of remoteness is removed; unless protected by some marked physical or climatic reason, generally backed by some economic factor. In the case of (2) we have such factors as soil texture, rainfall, temperature, vegetation types, and many others. Clay soils, difficult and expensive to work, carry good pasture, and are consequently usually under grass, but through stress of economic causes (often largely geographic) may be placed under suitable crops, as has been so vividly illustrated in Great Britain during its history, and especially during the past eighteen months. Under usual conditions, natural grass-lands will be either roughly grazed or gradually improved by drainage, manuring, etc., and made fit to pass ultimately under the plough. Woodland may be cleared of natural growth, manured (often by the burning of such vegetation) and grassed without use of the plough (as in Australasia) until such time as economic conditions (growth of population, approach of roads, railways, etc.) renders the production and transport of other crops needful or possible.

Should it be desired to return to grass land previously under cultivation, the complexity of the matter is well shown by the following details,[1] which must be taken into account:—

1. Duration of Pasture—
   - (*a*) One to two years.
   - (*b*) Up to five years.
   - (*c*) Indefinite length of time.
2. Kind of Pasture—
   - (*a*) For forage, dry or green.
   - (*b*) Grazing.
   - (*c*) Hay, followed by grazing.
3. Kind of Stock—
   - (*a*) Horses.
   - (*b*) Cattle.
   - (*c*) Sheep.
   - (*d*) Pigs, etc., etc.
4. Humidity (level of water table, rainfall, etc.)—
   - (*a*) Wet soil.
   - (*b*) Moist soil.
   - (*c*) Dry soil.
   - (*d*) Irrigation by flooding.
   - (*e*) Irrigation by other systems.
5. Nature of Soil (suitability for clover, lime content, etc.)—
   - (*a*) Peaty soil.
   - (*b*) Mineral soil (clay, loam, sand, gravel), light, medium, heavy.

[1] Heinrich, M. (quoted from *Internat. Rev. Sci. and Prac. Agric. Monthly Bull.*, Rome); *Fühlings Landwirt. Zeit.*, April 1915, Stuttgart.

6. Situation—
   (*a*) Elevation above sea-level.
   (*b*) Exposed to extremes.
   (*c*) Protected against extremes.
   (*d*) Sheltered by woods.
   (*e*) Slopes, etc.

Examples of Geographical Control.—As illustrating the effects of even minor topographical influences, Ward[1] may again be quoted:—"The value of land is obviously determined largely by its position with reference to slope, exposure, and liability to frost occurrence. . . . California furnishes many excellent examples. A grain ranch lying in a frosty pocket may there be next to land which is well established in oranges. The kind of crop which can be grown, and hence the financial return, also depends largely on exposure to sunshine and frost, protection from destructive winds, and the like, as well as upon soil."

The effects of altitude play an important part: a farm may range through many hundreds (or even thousands) of feet, and show great climatic variations. The following may be cited: In Mid-Wales, on the coast, it is possible for a farm to include several or even all of the following types of land:—(*a*) salt marsh, (*b*) lowland peat bog, (*c*) lowland arable and pasture land, (*d*) wooded valley, (*e*) upland peat bog, (*f*) upland sheep pasture.[2]

Newbigin[3] cites the case of "some of the valleys tributary to the Rhone, in the Canton of Valais," where the following conditions occur:—(*a*) The true village, with homesteads, buildings, and cereal culture, etc.; (*b*) higher up the valley the spring cow pasture, with cow houses and less elaborate dwellings; (*c*) still higher, huts for cowherds and cheesemaking; (*d*) a fourth village in the hot Rhone valley, with vineyards and orchards. Thus each family may possess as many as four houses.

In Peru, Bowman describes "four-storey farms ranging from tropic fruits through corn and potatoes to sheep." Sugar-cane and tropic and sub-tropic fruits are grown on the alluvial fan of the main valley, Indian corn on the flat upper slopes, potatoes in moister soil near the edge of the woodlands, and sheep on the upper pastures. Irrigation and terracing are largely employed in the valleys and on the steep hillsides.[4] Although similar altitude tends to establish a certain uniformity, it does not necessarily imply any such condition, since varying soil conditions may bring about considerable changes. In the combination of soil texture and mineral character, together with the prevailing climatic conditions, lies the whole of local agricultural possibilities. It is immaterial how deep or fertile the loam is if climatic conditions be not favourable. Rainfall and sunshine must be so balanced as to afford suitable conditions for some crops ere agricultural operations can be completely successful. If the climate should prove

[1] Ward, *op. cit.*, p. 305.
[2] Walton, C. L., *Parasitology*, p. 208, December 1917.
[3] Newbigin, M. I., *Modern Geography*, pp. 189-191.
[4] Bowman, I., "The Country of the Shepherds," *Geographical Review*, June 1916.

to be optimum for some particular crop (or crops)—ranging from oranges to wool—then, within the limits indicated by such conditions, sooner or later such crop or culture is practically certain to arise. Even should the soil not prove naturally perfect, then will the soil conditions be "made" by addition of missing qualities (and especially so should the economic factors be at all in the cultivator's favour). Heavy soil can be lightened, light soils improved by "green manuring"; deficiencies in lime, potash, etc., made up. Stock will help crop, and crop stock, and so on. Such materials may have to be imported from other countries. The Channel Islands are an example of an approach to climatic optimum coupled with (originally) very adverse soil conditions, the latter now completely altered.

Certain geological formations produce soils of pronounced types that dominate whole areas, even where the climate is somewhat variable; while the inherent physical properties of others cause inevitable differentiation (even in similar climate), since clay holds damp and weathers into hollows and valleys, while limestone remains as dry hills or plains.

Every crop has its own particular optimum, though it does not follow that all the crops suitable to any given area will be grown therein; the selection will be governed by the factors already alluded to. Apples, for instance, can be grown in a great many climates and soils provided the right variety be selected, and even with considerable success, and apart from the general optimum. Young[1] describes the Law of the Optimum as illustrated by apples in the U.S.A., and his results may be summarised here.

For any given variety of apple there is for each of its characters a certain intensity of each essential factor of the environment at which, other conditions remaining the same, that character reaches its highest development. A variety will appear at its best when grown in an environment the factors of which are as near as may be to the optimum intensity for all characters. Since the factors exert interacting influences, a certain harmonic balance among them is necessary to maintain the optimum conditions of environment. In the absence of this balance certain characters may fail to reach a proper degree of development, while others develop to excess. Twenty-four varieties originating in east and mid-western North America, and selected and propagated for their excellence, show distinct differences when grown under different conditions. The characters noted were size, form, stem, cavity, calyx, basin, skin, colour, internal structure, flesh characters, keeping qualities, specific gravity, and chemical composition. It was found that thinning of the crop may result in increase in size owing to the larger amount of moisture available; temperature and length of season are of importance in determining respectively the rapidity of growth and the degree of development attained—the optimum for growth is not the best combination of factors for the development of other desirable characters. Change of temperature is believed to cause diminished circulation of

[1] Young, W. J., *American Naturalist*, October 1914.

sap, and thence an elongation of the axis of the fruit relative to the horizontal diameter, the supply of sap being insufficient to provide simultaneously for the development of flesh and elongation of axis. Unfavourable conditions generally result in increase in length of stem. Dry air and sunshine are favourable to the production of a clear smooth skin, and light is of course *the* important factor influencing colouring in fruit. A number of seeds must develop in order that there may be proper symmetry, and this depends upon thoroughness in cross pollination. Aroma is influenced by temperature and elevation; a cool climate and high elevation are favourable to its development. Texture of flesh is governed by factors influencing growth, "mealiness" (coarseness) is due to excess of growth, and hard flesh to under-development. Failure of good varieties to develop characteristic qualities in new regions is due to lack of balance among the environmental factors.

Winslow[1] has studied certain of these aspects for British Columbia. After noting that the acreage under apples in British Columbia increased from 6000 in 1900 to over 38,000 in 1913, he states that the length of the growing season depends upon the length of time during which the mean temperature is over 43° F., and this varies in different regions from 175 to 240 days. The difference between localities can be expressed in heat units; for instance, Hood River totals 15,315 on the average, Vancouver 12,607. The six hottest weeks of the year largely determine the range of particular varieties; for instance, Spokane has a growing season of 216 days, a total of 12,620 heat units, and the average temperature of the six hottest weeks is 68·6° F. Contrast with this the optimum requirements of the apple "Winesap"; this variety demands a growth season of 225 days, 13,400 heat units, and a six weeks' temperature average of 70-72° F. McIntosh Red—a Canadian apple—on the other hand requires 195 days, 11,052 heat units, and 68·2° F. for the six weeks. The U.S.A. Federal Bureau of Crop Production estimated the percentage of losses in United States apple orchards for 1912-14 as due to climatic causes as follows:—

Cause.	1914.	1913.	1912.
Deficient moisture . . .	22	18	10
Frost or freeze	21	47	29
Other climatic disturbances .	8	8	14
Total climatic causes . . .	51	73	53

As an instance of the effects of naturally optimum conditions the following is of interest.[2] The apple was introduced into the Cordilleras of Chile and Argentina soon after the discovery of America, and spread rapidly by natural means. Now, the wild apple country in that area is,

[1] Winslow, R. M., *Horticulturist and Beekeeper*, Ontario, November 1914.
[2] Fisher, W., *Journal of Heredity*, August 1915.

roughly speaking, cut in half by the 40th degree of south latitude, and extends about 200 miles north and south on both sides the divide. In Chile it extends to the Pacific coast, and in Argentina to the eastward limit of tree growth. The heart of the area lies just north of Lake Nahuel Hapi, between the river Limay and the divide. The general level of the valleys is about 3000 feet, and the minimum temperature 70° F. The indigenous vegetation varies with the rainfall from dense rain forest, or open Araucaria forest, to mountain meadow and dry grass-land. The apple is *P. malus* (L.), and is specially abundant, and reaches its greatest development in regions of moderate rainfall with some protection from cold dry winds. Fruit is to be found of all sizes, forms, shades, flavours, and degrees of acidity and sweetness, showing that this new habitat is even more favourable than the old. The fruit is often gathered and made into cider, or eaten by the numerous herds of cattle. Woolly aphis is spreading fast and doing damage.

I have given these examples at some length, as they seem to illustrate exceptionally well the action of certain geographical controls and of methods adopted in consequence. As is well known, very elaborate precautions may be taken to screen considerable areas, and great expense incurred, as in the use of "smudge pots" against frost in the fruit areas of California, Florida, Colorado, and elsewhere, where the temperature of an orchard can be temporarily raised 10° F. on the few occasions when this one factor of the local environment proves temporarily unstable. (The thermostat is now coming into use, and rendering a self-lighting appliance available in such cases.) It has further been found that the "cost of production, in general, diminishes as the size of the orchard increases," and that each locality has an optimum for that also, the limit being set by natural and economic conditions; the cost of production being lowest where the extent of the orchard more closely approaches this limit.[1]

The above-mentioned control of size of farm or holding applies almost throughout agricultural practice in all areas that have become stabilised; great variability in the size of holdings in an area usually points to change.

It has been stated[2] that radical changes in farming only occur through (1) the introduction of a new enterprise more profitable than those previously followed; (2) the appearance of some disease or pest, which may render some crop unprofitable; (3) the development of transportation facilities, which render profitable some enterprise previously impossible; or (4) the advent of a rival industry, obliging the adoption of intensive farming systems. The same writer further[3] states that the type of farming followed in any given case must be adapted to local soil, climatic, and labour conditions and especially to local conditions with reference to market facilities as well as to business conditions existing on the individual farm. When the conditions affect-

[1] Vickers, H. A., Oregon Agri. Coll. Exp. St. *Bull.*, 132.
[2] Spillman, W. J., *Economic World*, July 1915.
[3] Spillman, W. J., U.S. Dept. Agric. *Bull.* 341, January 1916.

ing the agriculture of a region have remained stable for a considerable period, local agricultural practice tends to become approximately what it should be for the best results, provided the practice which gives the best immediate returns does not unfavourably affect soil fertility. When conditions change, even slightly, if the change is permanent, local farm practice begins to change, and ultimately adapts itself to the new conditions. Any of these subjects could profitably be treated as a separate essay. Russell[1] considers that the development of agricultural methods in England have been along three great lines of progress:—(1) Introduction, usually from Flanders, of crops not previously grown on British farms; (2) the removal of obstacles that prevented crops from making as full growth as they might; (3) the introduction of new methods for increasing the growth of the plant. The main obstacles to increased growth lie in the climate and in the soil. Climate apparently cannot be altered; therefore crops and varieties suited to conditions must be grown.

Effects of Human Interference with Natural Conditions.—Human intervention and interference has had very varying results, unfortunately, in many cases, by blindly destroying the natural local balance and relative environmental stability, thus bringing into play geographic factors which often act as adverse controls. Forests once burnt may be almost impossible of replacement even by profitable agriculture (at any rate for a considerable time), and the land thus bared may for long periods become weed-clad; winds have free play and work havoc, and good soils become exposed and ruined by erosion. Russell Smith gives it as his opinion that "the greatest and most menacing of all resource waste is soil erosion. This is the irreparable destruction, man's greatest crime against his environment. . . . Without a food supply, an environment ceases to support man."[2] Sand areas, quiescent under their natural covering of vegetation, become unbound, should this cover be destroyed, and, aided by the wind, move to and fro, overwhelming fertile farm lands and turning them into dune and desert. The close grazing by sheep during droughts in Australia has also had disastrous effects upon the natural pasturages. In the Astrakan province[3] 10,000,000 acres of shifting sand have been formed during the nineteenth century, and the sand is estimated to spread at the rate of 100,000 acres per annum. The principal cause of this rapid transformation of good pasture into barren sand is the bad management of the pastoral population, who keep their flocks and herds so long in one place as to result in the complete destruction of the turf. Conditions are not much better where arable farming is practised, for the tillage implements loosen the surface, after exhausting the soil by bad husbandry and successive crops without manure. As the crops fail, the sand invades the ruined field and covers whole areas. The trouble is combated by planting willows, *Elymus*, and herbaceous crops.

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[1] Russell, E. J., *Journal Board Agric.*, September 1916.

[2] Smith, J. Russell, "The Oak Tree and Man's Environment," *Geog. Rev.*, Jan. 1916.

[3] Terslov, J. G., "Agric. and Sylvic.," Petrograd, April 1916. (Abstract in *Intern. Rev. Science and Prac. of Agric.*)

Professor Brunhes[1] has some illuminating remarks regarding the impress of the geographic environment upon the ploughs of various lands. "Show me your plough," says he, "and how you drive your furrow, and I will tell you whether your share, which barely breaks up the surface, is that of a nomad shepherd whose main source of wealth is his flock, and who comes in haste, almost by stealth, to sow where he will come again only to reap, or whether that wooden share, whose furrow is also no deep one (as well may be the case since the mud it cleaves is so impregnated with salts that it is risky to trench too deeply, if plenty of water is not available wherewith to irrigate freely enough to dissolve the salts), belongs to an Egyptian *fellah* and coexists with a given type of irrigation methods. I will tell you whether you are a peasant from these fields of ours that have been cornfields time out of mind, from the districts of Beauce and Brie, where the character of the furrows, a tradition in themselves which dates back hundreds of years, at once reveals individual ownerships, whether on a small or a large scale, and also one of the most persistent and most perfect forms of conquest by culture. Or, at sight of the plough, I can say if you are engaged in trenching chiefly rich earth, in order to sink the beetroots with which the syndicate owning the neighbouring sugar factory provides you sugar-producing plants which are bought and sold in advance. I will tell you finally, when you show me the ploughs, a whole battery, adapted to steam or electric force, which are simultaneously at work beside your seed drill, that you belong to a region where labourers are few, or almost unobtainable."

The enormous alterations brought about by the constant improvements and increases in means of transport and the introduction of refrigeration in particular, are sufficiently well known: one example of the subsequent effects of a railway on the agriculture of the High Alps may be quoted.[2] In the highest section of the Tarentaise valley, above Moutiers, three regions are evident. (1) The highest, of calcareous Triassic rocks, steep slopes, bare above, with pines below, and very cold in winter; (2) more open, slopes gentle, floor alluvial, summer warm and dry, and grew vines before the advent of *Phylloxera*; (3) calcareous rocks, with gorges and small basins, very like (1), but warm and dry in summer. The making of a railway to Moutiers brought about many changes. Formerly wheat and vines were cultivated up to their extreme limits, now the people concentrate more and more on rearing cattle, and with the proceeds purchase wheat, wine, etc., from Provence. The migrations of the pastoral life leave no time for the care of vines, especially as the population is now reduced by emigration. Less wheat is grown, as there is now no danger of winter starvation, and lucerne, clover, and sainfoin take its place; formerly the pastures would carry more cattle than they could store hay for in winter. Less Gruyère cheese is now made on the mountain pastures. Formerly each household had a few sheep, the wool being used for clothing, now they are

[1] Brunhes, J., *Scottish Geographical Magazine*, July 1913 (Trans.).

[2] Arbos, Ph., *Annales de Géographie*, July 1912. See also *S.G.M.*, vol. xxviii. p. 591.

bred for export, and feed, without supervision, on slopes the cattle cannot reach, and breed twice yearly.

Selective Breeding: Action and Reaction of the Environment.—The effects of environment can be seen and studied in the many breeds of domestic stock to be found in all parts of the world, even allowing for the differences brought about by human selective action in the more highly complex communities. The effects of environments other than those natural to various breeds also bring out interesting points in the action of such factors. Speaking of the effects of the climate of parts of South Africa upon imported stock, Thomas [1] notes that the difference between the rise of temperature by day and its fall by night is very great; it is as though summer and winter occurred in the course of every twenty-four hours. Cattle and other stock are seriously and adversely affected, and the cold is most intense when the grass is poor and innutritious. The animals then draw upon their fat store, and in three or four months may die of literal starvation, unless shelters and artificial fodder are provided. Cattle would, he says, fare better, exposed to English winter nights. Shorthaired cattle are preferred as giving less harbourage to ticks, but cattle with good coats remained in better condition during winter. The same writer states, further,[2] that the cattle of Texas, imported by Spaniards in 1500, have lost every trace of that breeding which their ancestors possessed so highly, and which the same cattle to-day maintain in Spain. In South Africa a pure Shorthorn herd, so imported and kept, was noted to have lost practically every typical characteristic of the breed as known in England. "The pure progeny of pure progenitors had literally been forced into the mould provided by the natural circumstances of the country." They had been obliged to forage for themselves in summer and winter, without shelter from sun-heat or low temperature. "It is difficult to imagine a more wretched animal than the Shorthorn on scanty keep and exposed to the vicissitudes of the weather." Of course we are here largely dealing with the effects of natural conditions upon types to a large extent artificially built up. The true results of the South African climate and conditions may be seen in the native breeds, as witness the Africander, Mashona, Angoni, Zulu, and Hottentot cattle. Further points are mentioned by Willis.[3] In the Tropics cattle are mainly used for draught purposes, and are of Zebu type (the yoke pulling on the hump). Speaking generally, the best breeds have been produced where there is plenty of grazing land. In India, for instance, in Gujerat and other parts of the north, and southward into the Dekkan, there is but little pasture, and the rainfall is precarious; in Travancore and Ceylon there is hardly any grazing land at all and too much rain, and breeds deteriorate. In Brazil the best breeds (and the dairying industry) are in the highlands of the south. The best Tropical breeds occur "in districts where flocks or herds are large, and under the care of professional herdsmen; in the

[1] Thomas, O., *Agricultural and Pastoral Prospects of South Africa*, 1904, pp. 23-4.
[2] *Idem, op. cit.*, p. 34.
[3] Willis, J. C., *Agriculture in the Tropics*.

bands of villagers, breeds are poor. A colder winter season gives better results, and, other things being equal, breeds deteriorate from north to south. Buffaloes being practically water animals, are extremely useful for ploughing the wet rice fields. Sheep are very thin and leggy, but improve northwards, as also do horses. It is not wise to introduce European breeds in order to cross them with those of the natives with a view to improving the latter; the practice only results in "weeds" and deterioration. The existing breeds are often exactly suited to local food conditions and agricultural implements, and an increase in size would destroy their utility. Improvements must be gradual, and by selection.

M'Connell[1] draws attention to the influence of geological regions on the local breeds of sheep in the British Isles; he states that at the time of writing some thirty distinct breeds were recognised, but formerly seventy! "In the olden time almost every heath, forest, hill, and dale, or other section of the country, with a definite set of characters, had its own special breed, or at least variety, quite distinguishable from those around it on every side." He further discusses the effects of different types of ground on wool, and much might be quoted from literature on this point.

Further Examples of Geographical Control.—The extremely interesting aspects of "dry" farming methods on the one hand, and irrigation on the other, could be discussed at length; transhumance; native methods of agriculture; the intensive culture of China, Japan, Java, and elsewhere; and the influences of race, labour supply, government, pests and diseases, and many other points might be elaborated from the geographical standpoint. This paper, merely designed to draw attention to the manifold bearings and interaction of Geography and Agriculture, must be closed with one or two general examples. The selection of such is difficult. Protheroe[2] draws attention to the diversity of French farming in the following vivid paragraph: "Her soil is, on the whole, superior to that of England, and in one respect she has a marked advantage. Berry has its *brandes*, Gascony its *landes*, Champagne its bald, dusty, chalk hills; but throughout the length and breadth of the country there are none of those stubborn clays which break the heart of the English farmer. . . . The rolling, treeless, unenclosed plains of Picardy are totally unlike the small, well-wooded, doubled-hedged fields of Normandy, or the *closeries* of Anjou, or the copse-clad labyrinth of short choppy hills and valleys of the Vendean *bocage*. . . . Throughout France, diversities of climate, land-ownership, and land tenure have left their mark . . . each different system of land tenure affects the grouping of the rural population. In Seine-et-Marne, or Somme, large farms and farmsteads, isolated . . . as on a smaller scale they are in Brittany. In Champagne, Picardy, or La Brenne the cultivators of the soil are grouped together in villages; a palisade of hedges and trees marks the clusters in which, on the high table-land of the Pays de Caux, the

[1] M'Connell, P., *Agricultural Geology*, 1902, pp. 299-312.

[2] Protheroe, R. E., *The Pleasant Land of France*, pp. 44-5 (1915 edition).

Cauchoie congregate." Hall,[1] in his most interesting *Pilgrimage*, gives the following description of the Dunbar area of Scotland: "Without doubt the most highly-farmed district in Britain—indeed in the whole world—this favoured district occupies a comparatively small area on either side of Dunbar, and the finest land of all is a thin strip to the east, not a mile wide, between the coast and the railway. The soils are red and sandy, mingled with a good deal of stone; they are really drift soils, resting on an outcrop of limestone near the shore, but they have been derived in the main from the Old Red Sandstone, which formed the country rock a little farther inland. Chemically speaking, there is nothing special about the soils; physically they are light, easily working loams, with a large proportion of sand-particles, but containing enough clay to give them substance and water-holding capacity. While they would be valuable soils anywhere, their special excellence is largely due to the way they are adapted to the climate prevailing in East Lothian, where springs are late, and it is important to have a soil warming up quickly; where also the summers are cool, so that little danger attaches to soils like these, which would suffer from drought under hotter conditions. A really dry summer is not desired on the best of these Dunbar soils, whereas many of the finest soils farther south never display their superiority to such marked degree as in parching seasons." A typical farm is described: fields large, and divided by stone walls—hedges waste land, and are a source of weeds—and the whole is under plough, the chief line being potatoes. "The superiority of the Dunbar potato seems to be due to the adjustment of soil to climate, which results in an equable growing period free from pauses caused by heat and drought, and prolonged considerably into autumn without excessive moisture or sudden cold, for the proximity of the sea maintains an even temperature."

Finally, and by way of contrast, we may consider the details given by Russell Smith[2] of a peculiar combination of cultures in Portugal by means of which rough hillsides can be made to produce a good income and yield a fourfold return, pork, cork, wood, and forage for sheep and goats. Cork oaks, seventy trees to the acre, are stripped every nine or ten years, and when finally cut are turned into charcoal for cooking purposes. The poorer the land (sandy and stony) the better the cork, owing to slower growth and consequently finer texture. "The Portugal hog leads a lean and hungry life for a year and a-half, and then comes an orgy, during which he eats acorns all day and sleeps on them at night, doubling or trebling his weight in three months. A big tree yields 100 to 400 kilogrammes of acorns. Goatherders and shepherds watch their flocks graze bushes and grass, and their produce is wool and milk; the ewes' milk being turned into cheese. The two oaks (*Q. suber* and *Q. ilex*) may grow mixed, or one may predominate. As a variant, wheat, beans, barley, or hay may be grown between the trees, hogs being turned in after harvest."

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[1] Hall, A. D., *A Pilgrimage of British Agriculture*, p. 131. 1913.
[2] Smith, J. Russell, *Geographical Review*, January 1916.

GEOGRAPHY AND HISTORY: A REVIEW.[1]

HISTORICAL narrative has reached a high degree of development, but a science of history is hardly begun, and without it the vast accumulations of historical knowledge are not being used as they might be for the well-being of mankind. With this conviction the author faces the question, How has mankind come to be as it is? On this subject there has been abundant theorising: thus some lay emphasis on physical qualities, others on race psychology, others on geographical factors, others on economic processes; but the inquiry has been too partial, too selective, too personal. It is necessary to follow the analytic methods of the biologist and the geologist, to make wide comparative studies, to detect the fundamental uniformities.

The second chapter, on the geographical factor in history, is mainly devoted to a discussion of man's dependence upon his physical surroundings. Political units have arisen, all the world over, at places determined by the conformation of the earth's surface—the termini of routes followed by successive migrant groups. And the human movements are to be referred neither to foresight nor to ambition, neither to swarming from a mighty hive nor to inherent restlessness, but to climatic vicissitudes, *e.g.* a cycle of dry seasons, which seriously lessened the productivity of an area. Raphael Pumpelly's archæological investigations in the cities of Turkestan show that the inhabitants were repeatedly driven forth by destructive changes of climate.

The third chapter shows that the course of history is determined not merely by geographical factors, but also by fundamental characteristics of man himself. This is illustrated by considering, as Maine and Morgan did long ago, the transition from the primitive group, where the individual identifies himself with his kin, to the civilised group where the individual identifies himself with his neighbours and with territory. This transition from kindred unit to political unit came about neither by deliberation nor by insight, but as the result of collision and conflict at the termini of routes. In the clash of old organisations the individual was emancipated from the dominance of the kin-group, its observances, its formulæ, and its ideas. "The release of individual self-assertion through the temporary overthrow of the domination of customary restraints has been the necessary prelude to the emergence of territorial organisation and the institution of personal ownership." The author shows that the geographically determined localisation of the transition leads everywhere to irregularity and unevenness in the distribution of political institutions, and he wisely lays emphasis on the fact that the central feature of the transition was "not merely the substitution of territory for blood-relationship as the basis of unity in human groups, but the emergence of individuality and of

[1] *The Processes of History*, by Frederick J. Teggart, Associate Professor of History University of California. New Haven: Yale University Press, 1918. London: Humphrey Milford. Price $1.25 net.

personal self-assertion." For, of course, no one can believe in an interpretation of human history, even if it calls itself scientific, which does not recognise that individual initiative counts for much. How far the author is from fallacious "biologism" is illustrated by his appreciation of the crucial importance of the "idea-systems" of human groups. While the differences in idea-systems are, no doubt, related to differences in surroundings, and are rubbed in by the discipline of the group, radical changes in idea-systems follow upon the collision of groups from dissimilar habitats. So, even to-day, war breaks up, at terrible cost, "crystallised systems of organisation and thought." (The author's view, which we share, is that man's ignorance of himself and of the lessons of his history has been one of the deficiencies of civilisation that has made the humiliating anachronism of the present war possible.) War may bring emancipation of ideas, but, on the other hand, there is historical evidence that human advancement may also be the outcome of the commingling and criticism of ideas in conditions remote from any battlefield. It should be noted that the author, on count after count, *e.g.* as regards the importance of route termini, climatic vicissitudes, collisions and conflicts at strategic points, necessary transitions from kinship groups to political groups, makes out a strong case for *the homogeneity of history*. It is this that makes a science of history possible.

In the last chapter Professor Teggart discusses three sets of factors in human evolution. (1) There are those that make for fixity and persistence, especially the inertia of the social heritage, and the drilling more or less enforced by the group. (2) There are those that bring about slow fluctuations or modifications, familiarly illustrated in language, especially the continual occurrence of slight differences in individual response and initiative, and the influence of contact with other peoples. "What we find actually throughout the course of history are the unmistakable results of constant processes manifested in fixity or persistence, tempered by other processes which gradually effect a modification of this rigidity." (3) But in addition to these two sets of processes there have been significant changes on a larger scale, often leading to advancement. Converging lines of evidence point to the conclusion that "human advancement has followed upon the collision of different groups." It is not the physical conflict that in itself has been of supreme importance; what has counted most has been the breakdown or subversion of the established idea-systems.

Perhaps the author lays too much stress on emancipation through war. It seems to us that a very strong case can be made in support of the thesis that freedom has also followed the slow seeping in of liberating scientific ideas, from Galileo to Darwin, and the gradual diffusion of religious ideas, notably those of Christianity. Later on, indeed, we find a notable saving clause: "War has been, times without number, the antecedent of advance, but in other cases, such as the introduction of Buddhism into China, the same result has followed upon the acceptance of new ideas without the introductory formality of bitter strife."

The author often speaks of the importance of individual initiative, but he favours the view that individual advances are mainly of the nature

of "*releases*" of imprisoned potentialities. He warns us against believing that human advancement has been due to human volition, against basing any conclusion upon a supposed desire for betterment. The whole trend of the argument seems to us to be unduly determinist: climatic changes for the worse enforce group movements; collisions of groups occur at termini of routes: the bursting of old shackles leads to the transition from kin-group to political group; the cumulative social heritage implies inertia; the conflict of groups leads to mutations and possible advance; the breakdown of old idea-systems releases individual powers that have been previously in bonds. There is surely another side to all this: that man, like any other vigorous organism, is a forceful agent, full of effort and endeavour, often with a bow tightly bent. Alike in the advancement of science and in the organisation of the social heritage, man makes progress not by trigger-pulling "releases" from without, but by the sweat of his brow and resolution from within.

It has been said that men begin the search for truth with fancy, after that they argue, and at length they try to find out. Professor Teggart's book is a contribution to "trying to find out" in the domain of human history. It will serve as a useful crystallisation-centre for other contributions at present floating about. It will doubtless "release" other scientific adventures of a similar sort, and the more the better, for a science of history is slow of coming. We have found the book intensely interesting, and its importance is obvious. It is clear and scholarly, and written with careful restraint, and we welcome it cordially as "a tentative statement, based upon the application of the method of science to the facts of history, made in the earnest belief that inquiry conducted along the lines marked out must ultimately lead to an understanding of the difficulties that beset our civilisation, and to a furtherance of the welfare of mankind."

J. Arthur Thomson.

GEOGRAPHICAL NOTES.

Europe.

Nagel's Map of Scotland.—By arrangement with the Committee of the National Collection of Old Maps of Scotland, we publish this month a reproduction of Nagel's rare map of Scotland, an account of which will be found in Mr. Inglis's article in the issue for June last (p. 220). The copy in the Society's collection is the only one, so far as is known at present, which exists in Britain. We hope to publish at a later date other examples of interesting early maps of Scotland.

Boundaries of the Future Czecho-Slovak State.—We have received the following communication from Sir Thomas Holdich:—"In the notice of my last book (*Boundaries in Europe and the Near East*), which appears in the October number of the *Scottish Geographical Magazine*, p. 395, I see that some confusion has arisen about the course of the river

Moldau, owing to a want of exactness in my definition of the proposed southern boundary of the Czecho-Slovak State, should the independence of that state be realised. On p. 49 the Moldau is correctly described as a part of the river systems of Bohemia comprising the basin of the upper Elbe. On p. 53, the Moldau is mentioned in a manner which appears to connect it with the Danube instead of the Elbe, in the sentence 'to continue the Danubian boundary to its junction with the Moldau,' etc. I regret that I did not observe that it could be so read. By the 'Danubian boundary' I do not mean the Danube, but the south-western boundary of Lower Austria contiguous to the Danube. This does not run to an actual junction with the Moldau, but reaches to a point very near its sources to which it could easily be carried. I admit that my expression 'Danubian boundary' is inexact."

Africa.

The German African Colonies.—To the March issue of *Colonies et Marine* the Comte Adrien d'Arlincourt contributes an instructive article on German ambitions in Africa. He points out in the first place the peculiar position of the three great German colonies. The Kamerun, South-West Africa, and East Africa form the apices of an immense equatorial triangle, within which lie French Equatorial Africa, Portuguese Angola, and the Belgian Congo. It has been for long the more or less openly expressed desire of the Colonial party in Germany to obtain control, by one means or another, of the French, Portuguese, and Belgian territories, and thus to link the German colonies together in one vast equatorial possession. One important step in this direction was taken before the war when the Franco-German convention of 1911 placed Germany in possession of a part of the French Congo. This extension brought Germany down to the Congo river, and practically cut French Equatorial Africa into two parts. German designs on Angola and the Belgian Congo were more or less openly set forth about the same period. Thus, in 1912, Dr. Ziegler, president of the German South-West African League, stated that Angola was a necessary complement to the German territories. Similarly the *Post* declared that the Belgian Congo must either be purchased at a heavy outlay, or taken "in virtue of the right of the most powerful."

Pending extensions by one or other of these means, the Germans were developing their African railway systems with a view to weakening the trade of the existing colonies, and preparing the way for a junction of the German colonies.

Thus developments in the Kamerun had in view not only a junction with German East Africa in the future, but the making of Duala, in the Kamerun, the port both of French and Belgian lands. The Duala line was to be provisionally prolonged by navigation on the Sanga river, and thus to reach the Congo, and then by the Belgian system to link up with the Tanganyika railway. The Tanganyika system, again, in addition to its existing main connection by Albertville to the Congo, was to be continued to Lusambo on the Sankuru. The scheme also

included two branches from the main route. The first, starting from Tabora, was to reach the bend of the Kagera, with the hope, ultimately, of drawing off the trade of the Northern Congo region. From Kilossa, again, a branch was to run to Bismarckburg, which was again to be connected round the end of Tanganyika with the rich Katanga district by a prolongation to Kambove. The ultimate annexation of Angola, and the completion of the Benguela-Kambove line would then have put German East Africa in connection with German West Africa. Where the necessary lines did not run through German territory, the way for future control was being prepared, in the fashion familiar elsewhere, by the intervention of German capital in the various companies concerned.

The author emphasises also the economic value of the territories included in German East Africa, and concludes by expressing the opinion that if Germany is allowed to set foot in Africa after the war, she must at least be prevented from again acquiring freedom of action in regard to railway construction. All the powers are alike interested in railway development within the continent, and new schemes should be considered by all.

General.

The Weather Reports.—The Meteorological Office has given notice that it will not issue further copies of the Daily Weather Report, the Weekly Weather Report, and the Monthly Weather Report during the war. Subscribers and others are, however, notified that, by arrangement with the director, copies can be retained for them and delivered after the war.

Economic Geography.

The Future of Antwerp.—One of the difficult problems raised by the war is the probable future of the large towns which have been in enemy occupation for several years. Will trade flow back into its original channels when these are restored to their rightful owners, or will it tend to remain in the regions to which it has been diverted during the war period? Time alone can give a complete answer, but the best hope for successful reconstruction lies in a careful preliminary consideration of the various factors, geographical and economic, which bear upon the question in each case. In the *Annales de Géographie* for July-September, M. A. Demangeon discusses, with a great wealth of detail, the problem for the town of Antwerp. In this article he analyses all the factors which made for the prosperity of the town before the war, its relation to its great rivals, especially Rotterdam, and goes on to suggest ways in which prosperity may be restored. The article is well worth careful attention. We can only summarise here the main points.

The great feature of the recent history of the town has been its rapid rise in importance since the middle of the nineteenth century, a rise dependent on the development of industry both within Belgium and in western Europe generally. The increase in importance has not only been great in itself, but also relatively to the rivals of Antwerp,

for, if foreign trade only be considered, the town before the war occupied the second rank among European ports, standing after Hamburg. More than four-fifths of the sea trade of Belgium was concentrated here, so that the prosperity of the country as a whole is bound up with that of its great port. The trade showed certain special features, and certain common to those of the other great ports of Europe. Thus Antwerp is the outlet and inlet of an industrialised country, and therefore imports food and raw materials, and exports chiefly manufactured goods. It differs from ports like Liverpool and Hamburg in that its trade is in goods, passenger traffic being relatively unimportant. In contrast with London also, it deals almost entirely in commodities, and is not a financial centre. Again, the greater part of the trade is transit trade, for Antwerp imports largely goods not intended for Belgium, and exports those not produced there. Of its transit trade, more than three-quarters either comes from Germany or is *en route* for Germany—a point of very great importance in considering the future. Further, the fact that Belgium is a free-trade country has been in the past of great importance for the growth of the port.

Another factor, of much importance for the future is that the profits of past trading have accumulated to such an extent that the people dispose of large stores of capital. Owing to the overseas connections, much of this was invested in distant countries, such as the South American countries, the Congo, Egypt, China. This store has not been depleted by the war, and in this Antwerp is much more favourably situated than Liège, which has not only suffered severely in itself, but also in the fact that much capital was invested in Russia, and is thus, at least meantime, lost. With her stocks of capital intact, Antwerp may hope to reconstruct her lost prosperity, if the other conditions render this possible.

Among the disadvantages of the port two depend upon political causes—that is, upon the treaties to which pre-war Belgium owed her frontiers. By the treaty of 1831 a part of Limburg was ceded to Holland, and thus a narrow strip of territory separates Belgium from Germany, just in the region where a direct connection between Antwerp and the Rhine would be possible. Further, as is well known, the Dutch frontier is so drawn that the lower part of the Scheldt does not lie in Belgian territory. M. Demangeon expresses the hope that after a victorious peace it may be possible to assure to Belgium such frontiers as will not deliberately fetter the development of her great port.

The profoundly difficult question, however, is due to the fact that the prosperity of the port is so intimately bound up with German commerce. This not only brings direct profits, but has a reflex action on Belgium industry, which gains greatly from the volume of trade passing through the country. M. Demangeon hints that, if Antwerp thrives, the Germans will never cease to covet it. On the other hand, many Belgians are of opinion that the loss of the German trade, by diversion to Hamburg and Rotterdam, would mean the utter ruin of the port. Already German merchants established at Antwerp have, during the war, moved to Rotterdam.

If German trade proper is cut off, that of Luxemburg and Alsace-Lorraine may, "in view of certain political possibilities," remain. M. Demangeon strongly urges also that, both as a sign of friendship and gratitude, and as a means of furthering French industry, the protective duties which interfere with the trade between eastern France and Antwerp should be abrogated, and that there should be free competition between Dunkirk and the former, instead of protection for the French port. He points out, further, that before the war Belgium had only an insignificant merchant fleet, and that the trade of the port was carried on chiefly by British and German ships. The loss of German shipping would greatly affect the port, unless it could be made up for. He urges the establishment of a Belgian merchant fleet, that French ships should use the port, and that French and British shipping companies together should establish regular lines of shipping to it.

As a prime condition, however, before the town can rally at all, industry in Belgium must be re-established, and the enemy compelled to restore the ruin he has made. The new coalfield of the Campine must also be worked, a shipping canal constructed between Liège and Antwerp, while Antwerp should endeavour to start industries of her own, in place of being wholly dependent upon her foreign trade.

Writing principally for his own countrymen, M. Demangeon emphasises the need for a Franco-Belgian understanding, and for the abandonment by France of the extreme protectionist position.

NEW BOOKS.

EUROPE.

The Making of Modern Yorkshire. By J. S. Fletcher. London: George Allen and Unwin, Ltd., 1918. *Price 7s. 6d. net.*

As may readily be supposed, the history of its largest county is also largely a history of England itself. Many subjects dealt with in this volume—and admirably dealt with—concern a much larger area. Such are, for instance, the enclosure of commons, which brought such misery to the peasantry between 1760 and 1867; the employment of child labour from the days when children were literally bound to the loom, and kept awake by the foreman's whip; the development of education and of toleration in religious matters; the growth of means of transit. But Yorkshire has its specialties too. In minerals it is one of the wealthiest counties in England. Besides the coal and iron, for which it is renowned, it has produced alum, jet, lead, and fine building-stone. Wool is a commodity with which Yorkshiremen have been familiar for nearly as long as with the tilling of land and smelting of ironstone, and it forms the basis of nearly all the textile industries which they have built up, industries now computed to be worth £100,000,000 a year. But, perhaps, if a Yorkshireman were asked what the county of broad acres had most reason to be proud of, he would reply that it was its great men. This is a theme to which Mr. Fletcher's pen gives special attraction. It is one full of romance, and makes a stirring tale of enterprise and of successes which have benefited the whole community. Many of these men have shown a high sense of social duty. If the Yorkshireman is fond of

boasting that there are as many acres in the county as there are letters in the Bible (or thereabouts), he can show other proofs of eminence which are beyond dispute.

The book is a mine of information, most readable—two qualities not always combined—and it is certainly not over-priced.

Human Geography in Western Europe: a Study in Appreciation. By H. J. Fleure, Professor in the University College of Wales, Aberystwyth. London: Williams and Norgate, 1918. *Price 5s.*

In his Preface the author modestly describes this book as an early draft of an attempt to appreciate the *genius loci* of some of the human groups which have become accustomed to live and act as such in Western Europe. He also states that while it is based on lectures and discussions in a class in Human Geography at Aberystwyth, it is not a text-book of Geography. The book forms a member of a series at present being published under the general title of *The Making of the Future*, of which Professor Patrick Geddes and Mr. Victor Branford, to both of whom Professor Fleure acknowledges indebtedness, are editors. The reader thus approaches it with a doubt as to the exact public for which it is intended, the geographer as such, or that wider audience which is interested, from many points of view, in post-war reconstruction. The most obvious criticism of the book is that this doubt is not cleared up by reading its contents. If in what follows we seem to emphasise this point, it is not for want of appreciation of the positive merits of the work, or from a failure to recognise the fact that some of its apparent defects are to be ascribed to present conditions, which render it difficult for a serious author to follow out his line of reasoning in the detail and with the wealth of illustration possible in more normal times. It is rather because we cherish the hope that in the future Professor Fleure may have opportunity to expand and amplify his material, and present it in a form which will do fuller justice to its freshness and vitality, and because, as Human Geography is a relatively new and unworked subject, the question of the best modes of presentation is one which should have full discussion. Meantime, we desire to call special attention to the book as a proof that the subject is a living one, capable, in the hands of an enthusiast, of displaying all the exuberance of youth.

Any writer on human geography has two courses open to him, in view of the fact that it is necessarily based upon physical and general geography. He may assume in his readers a more or less detailed knowledge of modern geography, and in his presentation of the physical conditions limit himself to such a summary statement as will furnish a suitable background for his special discussions. In this case his book must chiefly find its readers among experts, and its presentation of the main facts of physical geography will be appreciated by them just in so far as these are put in a fresh and striking fashion. In this case omissions, or those summary statements at which the pedant may cavil, are of minor importance, for the reader is presumed to have knowledge sufficient to explain and to supplement. If, on the other hand, he desires to reach a wider audience, his presentation must be both more detailed and more prosaic—for picturesque expressions leave many openings for misapprehension. An uncertainty as to the particular audience which it is desired to reach will naturally have a reflex action on the presentation, and we think this has occurred in parts of the present book. In the chapter on France, part of which has already appeared in this *Magazine*, and in that on the Iberian Peninsula, which seems to us in some ways the best in the book, Professor Fleure contents himself with a very summary account of the physical geography, as

though he was writing chiefly for an audience of geographers. On the other hand, in the long, and in some ways not quite satisfactory, chapter entitled "From the Alps to the Northern Seas," the structure of the Alps and of the Central European Highlands is considered in a good deal of detail. We are inclined to doubt if this description will be intelligible to those not already acquainted with modern work, while, on the other hand, the geographer proper might, we think, take exception to some of the statements made. We note, as a minor point, that in speaking of the Belfort gap, more generally known as the Gate of Burgundy, the author says, "Belfort, Bâle, and Ulm are all historic names connected both with its mediæval and its modern life." The unlearned, who has to look up the Belfort gap on an orographical map, will, we fear, find some difficulty in understanding how the relatively distant town of Ulm is connected with it, and the context throws no light upon the point. On the other hand, the account of the Central European Plain, which follows, is full of fresh and vividly-put points.

We recommend the book to the notice of geographers, old and new. Both will find scope within it for the exercise of their critical faculty; but its author, who is pushing out in various directions into uncharted seas, would probably be the first to admit that it is through the exercise of such free criticism that we may hope to make anthropogeography an integral part of modern geography.

GENERAL.

The War and the Coming Peace: the Moral Issue. By Morris Jastrow, Jr., Ph.D., LL.D., Professor in the University of Pennsylvania. Philadelphia and London: J. B. Lippincott Company, 1918. *Price 5s. net.*

Professor Jastrow's views of the war are developing. In his volume, *The War and the Bagdad Railway*, reviewed in the June number of this Magazine, his idea, several times expressed, was: From 1914 to 1917 the great war was a "European struggle for supremacy": from 1917 onward "a world war for democracy"; and the new aspect of the war was "clinched," he said, "by *our* entrance into the war" in the latter year. In his new volume, we find only lingering traces of such an undiscerning attitude toward the earlier years of the war. There is this statement, for example: "What appeared to be at the outset a struggle for supremacy among European nations soon revealed itself as a contest of an entirely different order." The world's eyes, we are now told, were opened to the great moral issue by Germany's flagrant breaking of a solemn obligation when she took a short cut through Belgium into France, trying to snatch a victory by cheating and by defiance of every humanitarian consideration. The Allies' formula for the war, as now given by Professor Jastrow, is "resistance to an attempt to propagate a national policy through military force." It matters little that Germany's present "national policy" is commercial domination rather than territorial aggrandisement. The bully spirit, unscrupulous and ruthless, is the same; and if the rest of the civilised world cannot exorcise the demon from Germany, they must at least render it powerless for evil. Professor Jastrow's formula for the Allies' task carries still more weight than it otherwise would by his confession that it was a bitter regret and disappointment to him to have to acknowledge the moral downfall of Germany.

With philosophic historians of recent times it is a commonplace that the Thirty Years' War was the last in which the great issues were *religious*, and that in modern wars *commercial* had taken the place of religious rivalry. Professor Jastrow calls upon us to consider the present world struggle as one in which, from the Allies' point of view, great *moral* issues are involved. That idea, of

course, is not a discovery of the author's, but the working out of it in this volume is both stimulating and informative—an excellent bit of war-work.

The moral, or rather immoral, German political philosophy, as here set forth, may be stated in a series of propositions :—

1. In German statecraft, national policy was allied with military force—the fundamental evil which the civilised world found itself up against in international dealings where Germany was one of the parties. Germany had come to believe that war was a proper means to the attainment of her national ambitions. That unholy alliance is fundamentally inconsistent with civilised intercourse between nations.

2. The proper aim of a State is the acquisition of power, whether for war against other States or for control of its own citizens.

3. The power of the State, according to German political theory, is not power derived from the people but power *over* the people, and held by a group of persons independent of the people.

4. War is a biological necessity : war eliminates weak States unfit to survive, and develops powerful States.

5. The German people were brought to acquiesce in that system of government by :—

(*a*) The passing of beneficial social laws.

(*b*) The manifest success of Germany, as so organised, in war, commerce, etc.

(*c*) The persistent inculcation of the belief that German institutions and all things German were superior to those of other nations.

(*d*) The inculcation of the belief that patriotism required mechanical submission to government regulations. The whole community thus became a great machine controlled by the governmental authorities.

The final section of the book, upon "The Coming Peace" or the essential conditions of an enduring peace, gives less satisfaction, savouring considerably of Utopia and the Millennium. Such writers, for instance, ignore the fact that the much talked of League of Nations to police the world and manacle any would-be bully nation, already exists in the Alliance of Nations now endeavouring to arrest Germany and her gang.

Modern Whaling and Bear-Hunting. By W. S. Burn Murdoch, F.R.S.G.S., F.S.A. Scot. London : Seeley, Service and Co., 1917. *Price* 21*s. net.*

In this volume Mr. W. G. Burn Murdoch has again given vivid and useful "Notes and Sketches of an Artist," as he did almost a quarter of a century ago, after his Antarctic voyage, the first of all the notable Antarctic voyages that have taken place during recent years. He tells us that 35,000 men and 700 vessels hunted the Greenland right whale in the eighteenth century, and that the old-fashioned Greenland whale-hunting has only recently been abandoned in Dundee, and the old-fashioned sperm whale-hunting in New Bedford. British whalers have obviously been too conservative in not taking up the type of whaling initiated by Captain Svend Foyn and his engineer Henricksen in Tonsberg in 1868. In eighteen years there were thirteen steamers of the new Norwegian type in the Atlantic Ocean, and before the war there were sixty-four at the Falkland Islands Dependencies alone, giving a gross profit of £1,350,000 annually. Mr. Burn Murdoch points out that the value of the produce of the different whales is constantly changing, and that the finner oil is now as valuable as sperm oil. He tells us that it is used for lubrication, for soap-making, and as wax for cooking, while the whale-bone is used for stiffening silk in France, and the body for guano. Since

Mr. Burn Murdoch wrote his book whale blubber has been used principally for explosives and for tempering armour-plates and guns.

Mr. Burn Murdoch does not fear the extermination of whales because of their increasing shyness, and the ultimate reduction in hunting owing to the cost incurred. He rightly recommends whale meat as an excellent food—better than beef!

There is much to interest the naturalist and physical geographer in the book, for beyond his useful economic details, the author gives interesting meteorological and oceanographical data in describing conditions north-west and north-east of the Shetlands. "To the N.W.," he says, "you come against dark hangings of rain, N.E. you are in the sun; back to the land and you are in the clouds again. It is no wonder that the sunny, crystalline stretch of sea a hundred miles north of Flugga Light calls one in town to go a-whaling." He adds that the whaling season ends off the Shetlands in September, not on account of the absence of whales, but on account of rough weather. He speaks of the colour and light of the Azores, and lucidly describes the Ladies' Gulf. "Truly this sea, between the Azores and Africa, is well called by shell-backs and South Spainers the Ladies' Gulf—most fine days, and blue, then a tempest. The rock Formigas we aim at lies between San Miguel and Santa Maria, to the south-east. But the wind now blows hard and the sea runs too high, so we turn and pound back to patrol the north side of San Miguel, where we will get a little slant of shelter from the land." The tracks of St. Miguel, Azores, he says, are "always uphill, through little whitewashed villages and narrow lanes, between low stone walls and crops of Indian corn, rather dry-looking, with pumpkins and gourds on the stubbles; past many farm-carts, loaded with golden maize or pumpkins, and with groaning, squeaking, wooden discs for wheels, till high up we came to little grass fields and hedges of bramble, and loose stone dykes with bracken and canes on them, and where the air was as fresh as in Perthshire, and there were very wide views of the blue Atlantic." Again, his picture in the Arctic waters depicts vividly the Greenland sea, "a wilderness of ice-pans and small floes, and the soft grey sky is reflected on the rippling lavender-coloured sea. The ice-pans are mostly blue and white, like blue muslin overlaid with white, which shows almost emerald-green under the water. On the pans are fresh-water pools reflecting the soft grey of sky, each pool surrounded by a rim of pale cobalt. So I wonder if there is any blue paper on board to paint on, with white body-colour; that might secure the effect most rapidly. And on some of the floes are seals lying at rest, while others disport themselves as dolphins do in the sea; but we stop not for these, for the lavender sky is deep in colour away ahead, so we know there is more or less open water free of ice." And again he graphically contrasts Arctic and Antarctic both with sketches and words. "This is the difference between Arctic and Antarctic. In one, man and his vessels dominate the scene; in the other the great forms of nature make man and his works very small." How real this is to the few who, like Mr. Burn Murdoch, have visited both! Referring to a considerable Arctic berg, he adds, "I saw again the stupendous ice-cliffs of the South, and their vast open caves, into which you could pack a dozen such Arctic ice-berg chips." So many other paragraphs are teeming with excellent notes and sketches made during his whaling and bear-hunting expeditions from Arctic to Antarctic. It is more of such an artist's touches that too often we dry-boned geographers and oceanographers need and should use.

BOOKS RECEIVED.

The Virgin Islands: Our New Possessions and the British Islands. By THEODOOR DE BOOY and JOHN T. FARIS. With 97 Illustrations and 5 Maps. Demy 8vo. Pp. 291. London: J. B. Lippincott Co., 1918. *Price* 12*s.* 6*d. net.*

Seaside Planting: For Shelter, Ornament, and Profit. By A. D. WEBSTER. With 34 Illustrations. Royal 8vo. Pp. 156. London: T. Fisher Unwin, Ltd., 1918. *Price* 18*s. net.*

Over Here: Impressions of America by a British Officer. By HECTOR MACQUARRIE, B.A. Crown 8vo. Pp. 243. London: J. B. Lippincott Co., 1918. *Price* 6*s. net.*

Le Bas-Maine: Étude Géographique. By RENÉ MUSSET. With 92 Illustrations and Maps. Medium 8vo. Pp. 496. Paris: Armand Colin, 1918. *Price* 18 *fr.*

The Danish West Indies under Company Rules (1671-1754). With a Supplementary Chapter, 1755-1917. By WALDEMAR WESTERGAARD, Ph.D. With Maps and Illustrations. Demy 8vo. Pp. xxiv + 359. New York: The Macmillan Co., 1917. *Price* $2.50. *Presented by the Author.*

Les États Chrétiens des Balkans depuis 1815: *Roumanie, Bulgarie, Serbie, Monténégro, Grèce.* By LOUIS ANDRÉ. Crown 8vo. Pp. iv + 264. Paris: Félix Alcan, 1918. *Price* 3.50 *fr.*

La Dalmatie. By GIUSEPPE PREZZOLINI. Small royal 8vo. Pp. 60. Paris: Félix Alcan, 1918. *Price* 1 *fr.*

La Dalmazia. Del Dott. Prof. GIOTTO DAINELLI. With Illustrations. Medium 8vo. Pp. 73. Novara: Istituto Geografico di Agostini, 1918. *Price, including Atlas, L.* 10.

Peru-Bolivia Boundary Commission 1911-1913. Reports of the British Officers on the Peruvian Commission. Diplomatic Memoranda and Maps of the Boundary Zone, and Illustrations. Edited for the Government of Peru by the Royal Geographical Society of London, 1918.

Edinburgh University Calendar, 1918-1919. Edinburgh: James Thin, 1918. *Price* 3*s. net.*

The Kearney High-Speed Railway. By E. W. CHALMERS KEARNEY. Reprinted from the *Transactions* of the Society of Engineers (Incorporated). London, 1917. *Presented by the Author.*

L'Insegnamento della Geografia nella progettata Revisione dei Programmi delle Scuole Medie. By Prof. GIUSEPPE RICCHIERI. Reprinted from the *Bollettino della Reale Società Geografica Italiana.* *Presented by the Author.*

"Aurora" Relief Expedition: Report of Voyage. By the COMMANDER. 20th December 1916 to 9th February 1917. Melbourne, 1918.

Description of a Guide to Jaspar Park, Ottawa. Department of the Interior, 1917. *Price* 50*c.*

Punjab District Gazetteers. Vol. xxx A. Kangra District. Lahore, 1918. *Price* 2*s.* 6*d.*

Bihar and Orissa District Gazetteers. Hazaribagh. Patna, 1917. *Price* 3*s.*

Central Provinces District Gazetteers. Chhindwara District. B. Vol. Statistical Tables (1891-1914). Calcutta, 1917.

United Provinces District Gazetteers. Bhandana District. Nagpur District. B. Vol. Statistical Tables. Bombay, 1916.

Publishers forwarding books for review will greatly oblige by marking the* price *in clear figures, especially in the case of foreign books.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE GEOGRAPHICAL BEARINGS OF THE ARMISTICE TERMS.

By the Acting Editor.

(*With Illustration.*[1])

Although the armistice arrangements which have been concluded successively with Bulgaria, Turkey, Austria-Hungary, and Germany cannot be regarded so far as anything but provisional measures, the details of which have been determined by military exigencies, yet they afford at least hints of probable future frontier changes, and have important geographical bearings. The latter are illustrated by the war maps at present on view in the Society's rooms in Edinburgh, on which the limits of the areas in process of evacuation by Austro-Hungarian and German troops respectively on the borders of Italy, France, and Belgium have been plotted in detail. The ethnographical maps shown also bring out some of the difficulties which will have to be faced at the peace in connection with the distribution of the various races and nationalities of Eastern Europe. The publication of detailed maps showing the armistice conditions is not meantime possible, but it may be useful to summarise some of the main points in connection with them.

Bulgaria.—Taking the different arrangements in their historical order, we find that the terms, in the case of Bulgaria, were purely military. At a later date, however, the new declaration of war by Rumania on the Central Powers, which nearly coincided in point of time with the signing of the German armistice, implied the abrogation of the recent treaty of Bukarest. The latter armistice, indeed, definitely included

[1] For the block of this illustration we are indebted to the courtesy of Dr. Munro.

this abrogation as one of its conditions. Now the treaty deprived Rumania of the whole of the Dobruja, which was, presumably, to have been handed over to Bulgaria by the Central Powers as part of the spoils of victory. Its abrogation means that at the Peace Conference the frontier between Bulgaria and Rumania, for the purpose of the discussion, is to be taken as that fixed by the earlier treaty of Bukarest, signed in 1913 at the end of the second Balkan war. This statement does not of course imply that at the Peace Conference frontier changes may not take place here; it only means that the Allies regard the whole of the Dobruja at present as Rumanian territory. It is, however, certain that Bulgaria's resentment at the loss of territory in the southern Dobruja after the second Balkan war in part accounted for her throwing in her lot with the Central Powers and thus with her old enemy Turkey, so that it seems desirable to give a few facts in regard to the general problem.

The Dobruja[1] is a steppe area lying between the great bend of the Danube and the Black Sea. The greater part has been in Rumanian possession since the treaty of Berlin (1878), when it was granted to her as a somewhat inadequate compensation for the loss of Bessarabian territory, with a Rumanian population, which was then united to the Russian Empire. The old notion that there is some sort of equivalence between the two areas prevailed, in the minds of Central European diplomats, at the recent treaty of Bukarest, for Bessarabia was to be permitted to unite with Rumania to console the latter for the loss of the Dobruja. Rumania indeed was informed, with much cynicism, that she was being given now what she had asked for in 1878, and should therefore be grateful to her conquerors. The statement, of course, took no account whatever of the numerous changes, military, economic, and ethnographic, which had taken place since the signing of the treaty of Berlin in 1878.

Since that time Rumanian settlement has taken place extensively in the Dobruja, formerly inhabited largely by Turks and Tatars, with some Rumanians and Bulgarians, and much capital has been expended on land development. The Danube also has been bridged at Chernavoda, where the railway line from Bukarest to the very important port of Constanza crosses the river. It was chiefly with the object of protecting this bridge that Rumania insisted on shifting her frontier southwards into Bulgarian territory in 1913 on account of the growing military strength of Bulgaria, and the power of the militarist party there. If the military party in Bulgaria, with the loss of its leader, permanently loses authority, it is possible that Rumania might be well advised to consent to some modification of the 1913 frontier.

We may perhaps add that the Dobruja is one of those Balkan regions in which the characteristically Balkan migration of population, as a result of political changes, has been most marked. When under Turkish rule it was inhabited chiefly by Moslems, largely of the pastoral type suited to the drought of the steppe. These Turks and Tatars, for

[1] Cf. Review on p. 470 of this issue.

the most part, followed the Turkish flag to the south, and the new population tends to engage in the cultivation of the land, and in commerce.

TURKEY.—In this case also the armistice terms did not in themselves settle any of the points in dispute, but they do afford certain indications of what is to be the future policy of the Allies. It seems clear that that policy implies that Arabia, Mesopotamia, Syria, and Palestine are not again to fall under Turkish domination. Since the signing of the armistice the British occupation of Mesopotamia has been extended northwards to include the town and vilayat of Mosul. In North Syria Alexandretta has been occupied by British and French troops, and, according to an official notification published on November 16, Turkish troops are to retire beyond the Taurus by December 15. This will give Allied troops control of the Baghdad railway as far west as the Bozanti tunnel, and also of the Cilician plains. Of the political future of the great area thus—presumably for ever—lost to Turkey, nothing can meantime be said, but indications are not wanting to suggest that its economic future may be bright. Mesopotamia has already made great progress under British military occupation. It is stated that the Tigris has been made fit for constant navigation, and that wharves, quays, and repairing yards have been built. There has been extensive railway construction, full details of which are not yet available. Much has also been already done for agriculture, and in this direction there are great hopes for the future. In Palestine there has been a considerable amount of railway building, the lines within the country being now connected up with the Egyptian system. With the future development of Mesopotamia also, Palestine and Syria together will take on their old character as a highway of traffic between that country and Egypt, and, as suggested on page 468 of this issue, the development of Mesopotamia is likely to have notable effects in North Syria, where Alexandretta will doubtless rapidly increase in importance. Of other prospective changes in the Turkish Empire nothing definite can meantime be said.

AUSTRIA-HUNGARY.—In this case, in addition to the stipulation as to the immediate evacuation of Italian lands, the armistice terms fix an evacuation of Austro-Hungarian territories to a line which is specified in much detail. The nature of the line in this case, no less than the care with which it is defined, has led to the assumption in some quarters that it is intended to serve at least as the basis of discussion at the Peace Conference. We do not yet know how far this assumption is justified, but the line is worth careful study, for it brings out with much clearness some of the difficulties in this part of Europe.

The area to be evacuated by Austro-Hungarian troops and occupied by Allied ones falls into two distinct sections, which may be described respectively as the Alpine and the Dalmatian or Dinaric section. Between the two is a gap within the Gulf of Quarnero. In the first case the problem to be solved rises from the fact that the present frontier both places Italy in a disadvantageous strategic position—and was drawn deliberately with this object in view—and also is so drawn as to include groups of Italian speech and strong Italian sympathies within the

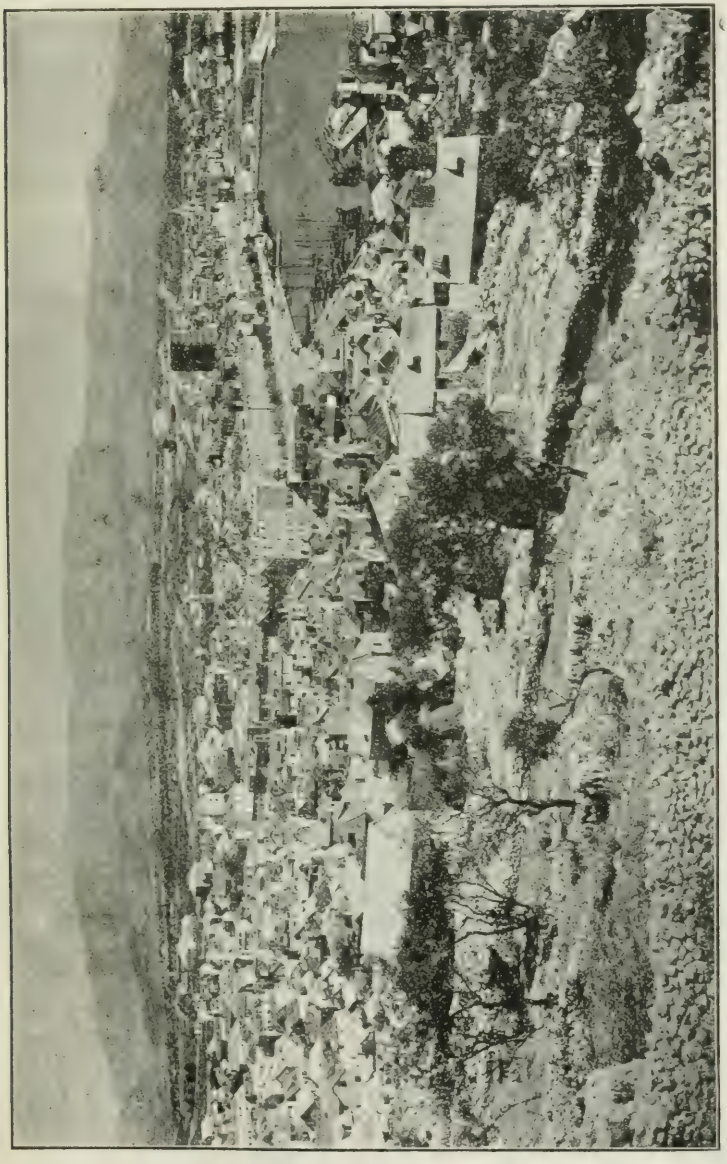
boundaries of German Austria. In the case of Dalmatia the matter is even more complicated. The existing frontier includes Italian populations within the confines of Austria, gives the latter a superfluity of good ports and naval bases, and correspondingly exposes a great part of Italy to attack both from the air and from the sea. But, in addition to all this, as a separate complication, we have the fact of the existence, both on the seaboard and in the interior, of Yugoslav peoples, in some cases intermixed with Italians, who desire to separate themselves from Austria-Hungary and to unite with Serbia into a large new South Slav State. The aspirations of the Yugoslavs having been recognised by the Allies, the Adriatic interests of at least four parties will have to be considered at the peace—Italy, the future Yugoslavia, German Austria, whose chief commercial port has hitherto been Trieste, and Hungary, whose only important commercial port has hitherto been Fiume. Nowhere probably, not even in troubled Russia, are the problems to be solved more difficult than in this region, and none, therefore, demands more careful study. Some of the problems are dealt with in some detail in Dr. Preller's article on Dalmatia (p. 448).

Others arise from the fact that the future Yugoslavia will, presumably, consist of States which have hitherto been independent (Serbia and Montenegro), and of lands which have formed hitherto a part of the Austro-Hungarian Empire. We can scarcely hope that there will not be difficulties among these different elements, and the utter chaos into which the Dual Monarchy appears to have fallen is another complicating factor. Since Yugoslavia must at least meantime be chiefly an agricultural state, specialising in cereal production and live-stock rearing, and since it is probable that there will be considerable industrial developments in North Italy after the war, and since Italy as a whole will always have need of the food and raw materials which Yugoslavia should be able to supply, it is to be hoped that a genuine friendship may develop between the two, and that the more pressing of the difficult frontier problems which might cause friction between them will be settled in a spirit of good-will and compromise.

The zone to be occupied in Dalmatia can be very readily shown by a pencil line on the sketch-map, on p. 452 of Dr. Preller's article. Beginning at the north-west corner of the map, it excludes Arbe, the most northerly island shown, but includes Pago, the next one, and the smaller islands to the south-west of it. The mainland area included begins at the point where the present administrative boundary starts opposite the south end of Pago, and extends eastwards to the watershed, and southwards as far as a line drawn from Cape Planca (which is the promontory to the west of the town of Trau), north-eastwards to the watershed. From Cape Planca the line winds along the islands in such a fashion as to exclude Solta and Brazza and the other smaller islands opposite Spalato, but to include Lissa, Lesina, Curzola, Meleda, and some smaller islands not shown on the sketch-map. The terms also expressly include the string of islands, large and small, which fringe the coast from north of Zara to south of Sebenico.

More concisely, we may say that the terms permit the Allies to

occupy the mainland of North Dalmatia, with the ports of Zara and Sebenico, and the islands which protect them, and, while excluding the



General view of Spalato.—(From *Rambles and Studies in Bosnia, Herzegovina and Dalmatia*, by Robert Munro, M.A., M.D.)

South Dalmatian mainland, with the towns of Trau, Spalato, Gravosa, Ragusa, and Cattaro, and the islands immediately protecting Spalato, the area includes the island chain from the south of Brazza to the north

of Gravosa. Were this arrangement to become permanent, of which, it may be repeated, nothing meantime can be said, Italy would obtain complete protection for her exposed eastern coast and would acquire the very largely Italian town of Zara, as well as Sebenico, while Spalato, Trau, Gravosa, Ragusa, and Cattaro would be left to Yugoslavia. Complete freedom of access to these towns would also be ensured by the allocation of the islands. As the article which follows indicates, claims of a much more fundamental character have been put forward by individuals both from the South Slav and from the Italian side; it may shortly become clear whether or not the armistice conditions represent a compromise reached by responsible parties on both sides.

In the Alpine section the zone to be occupied by the Allied troops has obviously been determined primarily by strategic reasons.

As the merest glance at a map will show, at present Austrian Tyrol is thrust down like a wedge towards the Italian plains, the frontier crossing the northern part of Lake Garda. The limits of the occupied zone, put briefly, are formed by a line drawn along the parting of the waters draining to the Black Sea through the Danube from those flowing, by various channels, to the Adriatic. The result is to cut off the apex of the wedge formed at present by South Tyrol, and to include in the occupied area the Austrian Coast Province with Trieste. Fiume and the islands of the Gulf of Quarnero are excluded from the occupied zone.

In more detail the Stelvio Pass, at present crossed by the Austro-Italian boundary, falls into the occupied zone, as does the upper Adige valley with the town of Meran, and the next section of the same river with Bozen, Trent, and Rovereto. The zone is also extended to the Brenner Pass, that is, to the head of the Eisack river, and includes the Rienz valley and a section of the important Pustertal railway, the boundary line crossing the railway near the village of Toblach. Farther to the east the river Isonzo, with the town of Gorizia, is included.

GERMANY.—The most important condition here, from the present point of view, is the evacuation of all the countries on the left bank of the Rhine, from the Swiss to the Dutch frontier. Since, however, a clear distinction is drawn as regards the terms of the armistice between Alsace and Lorraine and the remainder of the evacuated territories, it is assumed that while the former two merely revert to France, from whom they were torn in 1871, the occupation of the remaining territories to be evacuated is a temporary measure only.

These latter territories consist, first, of a large part of the Rhine Province (Rhineland), of a small detached part of the Grand Duchy of Oldenburg (Birkenfeld), of the Bavarian Palatinate (Rheinpfalz), and of the left-bank part of the Grand Duchy of Hesse. In addition to these lands the allied armies are to hold bridgeheads with a radius of thirty kilometres on the right bank from the crossing-towns of Cologne, Coblenz, and Mainz. Finally, there is to be a neutral zone, ten kilometres in width, established on the right bank of the river.

These conditions must be regarded as primarily defensive military measures, the object of which is to deny to the German army any

possibility of a new advance into Belgium, Luxemburg, France, or Alsace-Lorraine, and at the same time to demonstrate to the inhabitants of the bridge-towns, who saw the apparently irresistible advance of the German armies in 1914, the utter failure of the German attack. The railway connections, especially of Cologne and Mainz, with the interior of Germany, would make it, however, also possible to use these towns as bases for an advance into Germany, or through Germany into Austria, should this prove necessary.

These statements may be illustrated by a few words on the three bridge-towns. Cologne is the head of sea navigation on the Rhine, but its great importance lies in the fact that it stands at the end of the great natural highway of communication which follows the north-western margin of the Ardennes, and takes advantage of the practically continuous valley occupied by the rivers Oise, Sambre, and lower Meuse. Maubeuge, Charleroi, Namur, Liège, Aachen (Aix-la-Chapelle) are stages along this great highway, and it is fitting that the Europe which followed them in the reverse order as steps in the great German advance of 1914 should see them repeated afresh as stages in retreat.

From Cologne other lines of communication radiate in all directions. There are important railways on both banks of the Rhine, and, especially to the north of the town, many branching out over the Central European plain. To its position, at a point where the great route from Paris joins roads coming up the Rhine, Cologne owes, so far as architecture goes, a veneer of Latin civilisation somewhat deeper than that of most German towns. In addition to its great Gothic cathedral, not, of course, to be compared with the beautiful French cathedrals, it has a number of other interesting churches. As a modern industrial city its importance is very great, and its population exceeds half a million. The bridgehead from Cologne, on the right bank of the Rhine, includes the iron town of Solingen, and comes at least very near the manufacturing town of Düsseldorf, which is the river port for Elberfeld and Barmen. It includes also the university town of Bonn.

Coblenz, with a population of about 60,000, is, of course, a much less important town than Cologne. Like the latter, however, it commands the traffic, both by land and water, up and down the Rhine, and, as its name (=confluence) suggests, it stands at the point where a large tributary—the Moselle—joins the main stream. Through this tributary valley runs an important line of communication passing *via* Trier (Trèves) to Luxemburg and Lorraine, and within the town, on a beautiful site at the junction of the two rivers, stands the huge equestrian statue of Kaiser Wilhelm I., presented by the Rhine Province. The monument, alike in design and in execution, is emblematic of the worst elements in modern Germany. That both it and the *kolossal* National Memorial near Rüdesheim should come within the zone to be occupied by the Allied troops is a fact the significance of which can scarcely be lost upon those within Germany responsible for the course of events there since 1870.

Mainz (pop. over 100,000), the third bridge-town to be occupied, is the largest city of the grand-duchy of Hesse, which here extends to the left bank of the Rhine, and is an ancient town, with a fine

cathedral, placed near the junction of the Main with the Rhine. Owing to the fact that the latter river here makes a great bend to the south-west, skirting the base of the Taunus range before finding an exit between the Taunus and the Hunsrück, the bridge-head round the town approaches very near to that round Coblenz. The region is one noted for its fine scenery and its health-resorts, of which Rüdesheim and Wiesbaden are included within the occupied zone, while the limits of this approach very near to Homburg, one of the most frequented spas in Germany. Mainz has railway connections through the Palatinate with both Lorraine and Alsace, but its most important through route is that which passes by the Main river to Frankfurt, and there branches to Berlin on the one hand and Vienna on the other. From Frankfurt also there are a number of other railway lines to different parts of Germany. The town of Frankfurt lies just on the margin of the zone of occupation.

The next great right-bank Rhine town—Mannheim—is apparently not to be occupied, but its companion town, Ludwigshafen, which stands on the left bank, is, of course, included in the occupied zone. The fact is of some importance, for both towns were noted before the war for their chemical factories, and it is apparently in these that much of the poisonous gas employed by the Germans has been made.

DALMATIA.

By C. S. Du Riche Preller, M.A., Ph.D., M.I.E.E., F.G.S., F.R.G.S., F.R.S.E.

(With Sketch-Map and Illustrations.)

Among the abundant literature under the general head of Unredeemed Italy there are two outstanding recent publications on Dalmatia which derive special interest from the fact that the authors, both patriotic Italians, view the thorny problem of that comparatively small, but politically and strategically important country from diametrically opposite standpoints.[1]

The first of these works, by Professor Dainelli of Pisa, forms part of a series initiated by the well-known and enterprising Geographical Institute De Agostini of Novara. The series comprises the Trentino and the Carso,[2] edited by the late Cesare Battisti, to which has now been added Professor Dainelli's *Dalmatia*, with photographic views and an exquisitely coloured atlas cartographically illustrating his carefully compiled geographical, economic, and historical data. The other work, by Signor Prezzolini of Florence, is a searching and closely reasoned analysis of

[1] *La Dalmazia*, with atlas (sixty coloured maps), by Professor Giotto Dainelli. Istituto Geografico De Agostini: Novara, 1918.

La Dalmazia, by Giuseppe Prezzolini: Florence, 1915; also French translation, *La Dalmatie*, by Dr. Liubo Radić. Librairie Félix Alcan: Paris, 1917.

[2] This work is still in the press.

the various factors bearing upon the Dalmatian problem. Distinguished alike by precision of style and not only erudite but practical treatment of the subject from the author's point of view, the book found a ready and effective translator into French in Dr. Radic who, himself a Slav citizen of one of the Dalmatian islands, warmly endorses—with certain reservations—Signor Prezzolini's conclusions. Before dealing with the conflicting political views of the two Italian authors, it will be useful to briefly outline the historical, physiographic, and economic features of Dalmatia, which, from its complex character and its strategic position in the Adriatic, is eminently a country *sui generis*, and has in the course of many centuries passed through extraordinary vicissitudes.

I.—Historical Sketch.

The earliest historically known inhabitants of Dalmatia were Illyrians of Aryan origin, who, as Dalmatians—from *Delminium*, their stronghold—settled on the coast between the rivers Cherca and Narenta,[1] while Phœnician and Greek traders and pirates occupied some of the islands, and became the founders of the still enduring fame of Dalmatian mariners. Early in the third century B.C. a Gallic invasion led to a powerful Celto-Illyric condominium, whose piratical incursions on the Italo-Adriatic coast became a menace to Rome. Hence the succession of wars which the Romans, from 229 B.C. onwards, waged against the Illyrians, who were finally subjugated in 78 B.C., Dalmatia being, under Augustus, formed into the Roman Province of *Illyricum superius*. In the reign of the Emperor Diocletian (284-305), himself a Dalmatian by birth,[2] the country still belonged to Rome, but after the final downfall of the Western Empire in 480 it became part of Odoacer's, early in the sixth century of the Ostrogoth, and in 553 of the Byzantine Empire under the jurisdiction of Ravenna.

In the seventh century, after several Tartar incursions, Dalmatia was invaded by Croats in the north and by Serbs in the south, in which latter part Byzantium maintained a nominal dominion up to the tenth century, while Venice occupied the islands: but in 1052 the whole of Dalmatia became an independent Croatian kingdom under Crescimir Peter. However, already in 1100 the greater part of Dalmatia fell under Hungarian dominion, while the rest accepted the protection of Venice. For the next four hundred years Hungary and Venice contended with each other for the possession of the coveted country, which was, however, lost to both in 1669, when it fell a prey to the Ottoman

[1] Remnants of the language of the Illyrians still survive in their descendants, the present Albanians.

[2] Diocletian, the son of Dalmatian slaves, was born in Dioclea in 239 A.D., became Emperor in 284, abdicated in 305, and retired to his native country, where, on the site of the present Spalato, near the then important city of Salona, he built a sumptuous palace, and died in 313. His mausoleum at Spalato is still one of the monuments of that city. Of Diocletian in his retirement, and of his palace, Gibbon gives interesting particulars in his *Decline and Fall of the Roman Empire*, vol. i. pp. 502 *et seq.* The Roman remains of Salona are extensive and of great interest.

invasion, only the small Republic of Ragusa, founded in 1492, remaining independent. Upon the collapse and final retreat of the Turks in 1718, Venice occupied the whole of Dalmatia and retained possession for about eighty years, when, by the Peace of Campo Formio, it, together with Ragusa, Istria, and Venetia, passed to the Austrian Empire. In

Spalato: the Campanile of the Cathedral and the Mausoleum of Diocletian.
(From *La Dalmazia*, by S. Dainelli.)

1805, by the Peace of Pressburg, Dalmatia was allotted to Napoleon I., who, in 1810, incorporated it in his "Illyrian Provinces" on the lines of the Roman precedent. After Napoleon's downfall in 1814, the Congress of Vienna allotted Dalmatia again to Austria: it was then raised to a kingdom as an integral part of that Empire, and has continued as such for a hundred years down to the present day.

It is a remarkable phenomenon that during all these political changes Italian civilisation, founded by Rome and continued by Venice,

always reasserted itself and held its own in Dalmatia, both on the littoral and in the islands.[1]

II.—Physiographic Features.

The strip of Adriatic coast occupied by Dalmatia from the island of Arbe in the north to Spizza in the Bay of Antivari in the south, measures in a straight line north-west to south-east 240 miles in length, and from 5 to 15 and 30 miles in width (mean 21 miles), covering a superficial area of 4937 square miles. Of this area the mainland represents 80, the string of islands 20 per cent. The double and treble fringe of islands along the northern coast from Arbe to Zara and Sebenico, and the cluster of eight larger islands on the southern coast from Spalato to Ragusa, number over a thousand, including the *scogli* or rocky islets. This fringe increases the outer length of coast-line from 240 to 300 miles, and both the islands and the innumerable inlets of the littoral add enormously to the aggregate length of actual seaboard.

The fringe of islands and the littoral constitute a succession of partially submerged, *i.e.* subsided, parallel ridges up to 600 m. above sea-level, which are followed by more or less steep terraces of 1200 to 1500 m. altitude up to the crest of the Bebič and Dinaric Alps. The highest points of these, Mte. Santo (1753 m.) in the north, Mte. Trŏglav or Trecapi (1913 m.) in the centre, and Mte. Lŏvcen or Leone (1759 m.) in the south, lie outside Dalmatian, *i.e.* on Croatian, Bosnian, and Montenegrin territory, while Mte. Orien (1895 m.), rising immediately north of the Bocche di Cattaro, lies within the Dalmatian frontier. The curved crest-line approaches close to the sea at the northern and southern extremities, while in the centre it lies about forty miles inland. It forms the western edge of the great plateau of Bosnia and Herzegovina, which rises to about 7000 feet in altitude and then slopes down towards the Save Valley on the east.[2]

Geologically the Bebič and Dinaric Alps are a continuation of the

[1] Among the many naval battles fought in the Adriatic for the command of that sea were notably those of 1298, 1354, and 1379, when the Genoese defeated the Venetians; of 1380, when the Venetians destroyed the Genoese fleet at Chioggia; of 1571, when the Venetians and their allies, under Don John of Austria, destroyed the Turkish fleet at Lepanto; of 1811, when the British fleet beat the French off Lissa; and of 1866, when the Austrians beat the Italian fleet off the same island.

The great Venetian victory over the Turks at Lepanto in 1571 was more than balanced by the Turks wresting Cyprus (Famagosta) from Venice, as the Grand Vizier told the Venetian Ambassador at Constantinople in picturesque and incisive language: "In destroying our fleet at Lepanto you only shaved our beard; in depriving you of Famagosta we cut off your right arm. The arm once cut off does not grow again; but the beard grows the faster the sharper the razor that shaved it."

[2] The Dinarides were glaciated only to a small extent at their highest points. The subdued, rounded-off contours and bare rock surfaces of the lower hills and islands are due, not to glacial action, but to atmospheric denudation, wind erosion, and to extensive waste by solution of the readily yielding limestone rocks.—A. Penck, *Globus*, 1900, vol. lxxviii., p. 133 *et seq.*—J. W. Gregory, "Pseudo-Glacial Features in Dalmatia," *Jour. R.G.S.*, August 1915, p. 105 *et seq.*

to Agram
Banjaluca
to Brod
Croatia
Bosnia
Morlacca Coast
Arbe
Pago
Mte Santo 1753 m.
Chiena
Bugoino
Sarajevo
Zara
Zermagna
Mte Tròglav 1913 m.
Livno
Tenin
Grossa
Sebenico
Signo
Herzegovina
Kerka
Traù
Spalato
Narenta
Mostar
Solta
Brazza
Lissa
Lesina
Monte-Negro
Curzola
Meleda
Gravosa
Ragusa
Mte. Orien 1895 m.
Mte Ivrien 1759 m.
Càttaro
Spizza
Sketch Map
of
Dalmatia.
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S
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0 20 40 60 80 100 Km
railways.
Del: DRP.

Julian and Istrian Carso, and exhibit all the characteristics of that Mesozoic and Tertiary limestone formation, being broken up into a chaos of pits, basins, hanging valleys, deep-cut glens, and often inaccessible gullies. Except for the marshy estuary of the river Narenta, the rocky coast is throughout its length destitute of alluvia or beach formations. The few torrential rivers which descend from the Dinarides, often in cascades, are the Zermagna, Cherca, Cettina, and Narenta, of which the last-named is the only one that has its source on the Bosnian plateau beyond the Dalmatian frontier. A large percentage of surface drainage runs to waste through subterranean channels.

The bare declivities of the Dinarides represent about fifty per cent. of the total area of Dalmatia, and, except as scanty grazing ground, are practically unproductive. The other fifty per cent. are represented by the pastures, cultivated fields, orchards, vineyards, olive, pine, and oak plantations, and by the abundant evergreen shrubs and rich herbaceous—in part aromatic—vegetation of the littoral and the islands. The olive and pine flourish up to 1000 feet, the oak thrives up to 3000 feet above sea-level; in the denuded uplands reafforestation is much impeded by the destructive habits of grazing goats.

Like the flora, so also the fauna of Dalmatia corresponds with the typically Mediterranean climate. The mean temperature of the littoral is 52° F., the maximum (in July) 76°; the winter temperature rarely drops below 32°, except in the uplands. The annual rainfall varies according to the proximity of the mountains. At Zara it is forty inches, at Ragusa, close to the hills, sixty-four inches, while in the south, at Cattaro, *i.e.* in the trough between Mte. Orien and Mte. Lovcen, it reaches no less than 184 inches. The prevailing winds in Dalmatia are the *Bora*, blowing from the north down the Adriatic; the *Maestro*, from north-west, and the *Scirocco*, blowing up the Adriatic from south-east. The first-named is cold and dry, the second breezy and invigorating, the last hot and moist.

Although Dalmatia is physiographically a self-contained unit, its eastern frontier exhibits the obvious disadvantage of only skirting the upper slopes of the Dinarides instead of reaching the crest-line of the divide (2000 m. or 6600 ft.), which is its natural and also its scientific frontier.[1]

III.—Economic Features.

1. *Roads and Railways.*—The mountainous and broken character of the country renders the construction of roads and railways extremely difficult and costly, but a considerable network of both has been gradually built up in the last fifty years. The roads follow more or less the track of the old Roman roads radiating from Zara along the littoral and across the mountains into Croatia, Bosnia, Herzegovina, and Montenegro;

[1] Professor Dainelli claims not only a rectification of the eastern frontier, but also the Croatian coast and the Quarnero or Istrian islands in the north, as falling within the natural frontiers of Dalmatia—in all 1500 square miles, or an extension of one-third of her present area.

one of the first modern roads is the littoral one, 200 miles in length from Zara to Cattaro, built under the short régime of that great road-maker Napoleon I.

The railways comprise the network in the central triangle of Sebenico, Spalato, and Tenin, and two narrow-gauge (in part rack and pinion) mountain railways: one from that central part, *i.e.* from Tenin towards Banjaluca on the northern Bosnian railway, giving access to Croatia and Hungary, and the other from the Bocche di Cattaro to Ragusa,[1] and thence by the Narenta Valley to Mostar in Herzegovina, and across the divide to Sarajèvo, the capital of Bosnia. Both these lines are remarkable feats of engineering. A third, similar, intermediate line is projected to link Spalato direct with Sarajèvo *via* Signo, Livno, and Bugoino. This important third connection across the Dinarides has, however, been much delayed by the maritime rivalry of Fiume and Trieste, jealous of the Bosnian traffic being diverted to Spalato. A fourth, internal, and less difficult railway is that projected along the littoral from Zara to Ragusa to link up the maritime centres down to Cattaro. The present network of roads and railways in Dalmatia proper comprises 2600 miles and 230 miles respectively.

2. *Sea-borne Traffic.*—The most important communications are, of course, by sea. The principal mainland ports of Zara, Sebenico, Spalato, Ragusa (Gravosa), and Cattaro, and those of the islands, are served by 88 steamers connecting with Austrian and Italian ports, and by about 10,000 local steamers and sailing vessels, aggregating 80,000 tons, and employing 26,000 mariners. Navigation is enormously facilitated, on the one hand, by the great depth of 50 m. (27 fathoms) all along the coast and round the islands, increasing to 100 m. (54 fathoms) a short distance from the shore, and, on the other, by the sheltered position of the principal ports, several of which have double exit channels behind the protecting islands, while Cattaro is protected by its unique system of fjords—the famous Bocche di Cattaro, encircled by precipitous hills 2500 feet in height.[2]

The aggregate number of vessels which entered Dalmatian ports in 1912 was 78,000, with a tonnage of fourteen million tons, equal to one-third of the maritime traffic of Trieste, and to 52 per cent. of all the other Austro-Adriatic ports. By far the largest percentage of the Dalmatian imports and exports by sea was Austrian in the first, and Italian in the second place, the rest being a small percentage carried by British, German, Greek, and Turkish vessels. The total imports amounted in 1910 to 320,000 tons, the exports to 670,000 tons, or more than double.

3. *Production.*—The exports of Dalmatia comprise notably grain, timber, and cattle in transit from Bosnia and Herzegovina, and, among

[1] The terminus of the railway is at Gravosa, the port of Ragusa, situated in the sheltered Val d'Omble fjord. Off Ragusa lies the beautiful and romantic island of Lacroma—Richard I.'s island.

[2] The fjords of Cattaro are, like other similar ones, partially subsided bays converted to troughs in a faulted region.

indigenous products, salt, asphalt, tobacco, olive oil, fruit, flowers—notably *chrysanthemums*, both as plants and as powder—wine, sardines, the famous Maraschino di Zara, distilled from the Marasca cherry, and two important products of recent date, *i.e.* Portland cement and calcium carbide. The production of wine, more especially white, doubled in ten years (1903 to 1912), being now 1½ million hectolitres per annum, though at the expense of olive oil, which, owing to reduced plantation, decreased in the same period from 6200 to 4500 tons per annum. The fishing industry employs over 12,000 men, the annual takings amounting to 7000 tons, *i.e.* a value of £200,000, while the sardine fishery, as also that of oysters and mussels, has led to the development of a growing export trade.

The manufacture of cement and calcium carbide has become important only within the last ten years, thanks to extensive beds of specially adapted argillaceous limestone near Spalato, and to considerable hydro-electric power derived from some of the rivers. The annual production of cement amounts to 1,000,000 tons, besides 400,000 tons of marl exported as such. The calcium carbide industry produces 20,000 tons per annum, utilising for this and associated products the cascades of the rivers Cherca and Cettina by hydro-electric transmission of 90,000 horse-power to the large electro-chemical works near Sebenico. The greater part of the cement, marl (as manure), and carbide is exported to Austria, the rest to Italy.[1]

Thanks to her communications by sea, Dalmatia has thus, within the decade ending 1914, largely developed her resources, industry, and exports, while her present and future communications by land, *i.e.* by railway with Croatia, Bosnia, and Herzegovina, cannot fail to develop a considerable transit trade, more especially to and from Spalato, *facile princeps* of her ports.

IV.—Population and Administration.

1. *Population.*—Of special interest and importance on national Dalmatian grounds is the composition and distribution of the population. In 1910 the latter numbered 646,000, equal to a density of 50 inhabitants per square kilometre, or 135 per square mile, *i.e.* about the same as that of Ireland. The outstanding features relating to population, religion, and illiteracy are given in six short tables annexed to this paper, and are abstracted from the very detailed and complete official Austrian statistics.[2] Table I., being the most comprehensive in relation to the aggregate population of Slavs and Italians, as the two prominent races in Dalmatia, may find a place here as follows:—

[1] Dalmatia produces neither coal nor iron, and the production of other minerals is insignificant. The once flourishing silk industry, and that of shipbuilding, have greatly decreased.

[2] *Oesterreichisches Statistisches Handbuch*, Vienna.

Population of Dalmatia, 1910.

Croats,	505,000	78 per cent.	610,000 Slavs,
Serbs,	105,000	16 ,,	94 per cent.
Italians,	18,000	3 ,,	
Austro-Germans,	3,000	0·5 ,,	
Other nationalities,	3,000	0·5 ,,	
Non-residents,	11,000	2 ,,	
	646,000[1]	100	

This and the other tables lead to the following conclusions:—

(1) During the three decades from 1880 to 1910 the population of Dalmatia increased at the normal mean rate of 10 per cent. per decade. The annual emigration and other displacements of about 11,000 are balanced by immigration from the Balkan hinterland, and by non-residents from other countries. Of the aggregate population, according to the census of 1910, 78 per cent. were Croats, 16 per cent. Serbs, total 94 per cent. Slavs, and only 3 per cent. Italians, the rest being Austro-Germans and other nationalities. The Slavs increased in thirty years from 440,000 to 610,000, equal to 40 per cent.; the Italians decreased in the same period from 27,000 to 18,000, equal to 33 per cent.[2] The increase of population is therefore almost entirely due to the Slavs.[3]

(2) The Slavs constitute mainly the agricultural, labouring, fishing, maritime, and rural, the Italians more especially part of the industrial, commercial, professional, and urban population. The towns and villages represent 400,000, or 62 per cent., the scattered, largely pastoral population 246,000, or 38 per cent. of the total. The only town where the Italians have increased is their cultural stronghold Zara, *i.e.* from 6700 in 1880 to 9000 in 1900, equal to 33 per cent. In this town of 12,700 inhabitants the Italian community thus represents 70 per cent. of the population. But the increase of Zara is more than balanced by the decrease in Spalato (13,000 inhabitants), where the Italian community dropped from 5000 in 1880 to 1000 in 1900, equal to 80 per cent. In the former period it represented 50 per cent., in the latter only 8 per cent. of the population of that, now the largest town in Dalmatia. According to the official statistics, the Italian community in Spalato showed in the two decades, 1880 to 1900, an excess of deaths over births of 6 per cent., the Slavs an excess of births over deaths of 4 per cent.

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[1] In this and the other tables the figures are, for greater simplicity, rounded off to thousands.

[2] It appears that in 1865 the Italians in Dalmatia still numbered 55,000, or 12 per cent. of the population; the drop in the next fifteen years to 27,000, or half, was probably due to special causes, such as emigration to Italy, America, and other countries.

[3] Prof. J. W. Gregory (*loc. cit.*) rightly avers that the large proportion of bare rock and thin soil explains why Dalmatia remains so sparsely populated in spite of the money spent on it by Austria, and of its many great advantages of climate and position.

(3) The predominant religion being Roman Catholic. 539,000 Croats and Italians, or 83 per cent., including a small percentage of Serbs and Austro-Germans, belong to that Church: 105,000 Serbs, or 17 per cent., to the Eastern Orthodox Church, while Protestants number only 1000, and Jews 500.

(4) Of the aggregate population of 527,000 in 1890, no less than 437,000, or 83 per cent., were illiterate: by 1910 that phenomenally high figure was reduced to 63 per cent., or 393,000, of whom 390,000 were Slavs and 3000 Italians, the latter mainly labouring immigrants from Apulia. In other words, at the last census of 1910, 64 per cent.

Zara: the Five Wells.—(From *La Dalmazia*, by S. Dainelli.)

of the Slavs and 17 per cent. of the Italians above ten years of age were still illiterate, *i.e.* analphabetic. Although education is by law compulsory, it is difficult to apply compulsion to the lower grades of the Slav population, notwithstanding the great efforts made during the last decade to reduce the still abnormal percentage of illiteracy.

Administration.—Up to 1918, *i.e.* as an integral part of the Austrian monarchy, Dalmatia was divided into fifteen administrative districts, ranging from 15,000 to 100,000 inhabitants, under a lieutenant-governor residing at Zara. The administration of the law, of the Roman and Eastern Churches, of education, local finance, and all internal matters, was vested in autonomous bodies and in a Diet composed of forty-three deputies, of whom forty-one were elected by the local bodies, while

two, *i.e.* the Roman Catholic Archbishop and an Orthodox Bishop, were *ex officio* members. The Roman Episcopacy is composed of the Archbishop and five Bishops; the Orthodox Episcopacy of two Bishops. In the Austrian Parliament or Reichsrath Dalmatia was represented by eleven members elected by direct, equal, and secret suffrage. Zara is the administrative and educational, Spalato the principal commercial and maritime centre of Dalmatia, while Sebenico and Ragusa come next in importance, and Cattaro was chiefly a military port.

It is thus seen that in internal administration Dalmatia was virtually self-governing; but in all local and parliamentary elections the Slavs command an overwhelming majority, while the Italians are—except in Zara—reduced to a fractional minority.[1]

V.—Conclusion.

After the foregoing rapid survey of Dalmatia past and present, it remains to refer briefly to the problem of her political future in relation to Italy. The widely divergent views enunciated on this subject by the two Italian writers in their publications quoted at the outset, may be succinctly stated as follows:—

Professor Dainelli claims that in Dalmatia the Italians constitute the cultured, superior, prosperous, and more civilised, the Slavs the uncultured, inferior, less civilised, and poorer element of the population. The Italian element has diminished and is diminishing in numbers, not for want of vitality, but through the relentless supplanting pressure of the Slavs, in this respect favoured by the Austrian Government. The superior record of Italian civilisation in Dalmatia, extending over centuries, in language, art, and education is attested by the low Italian percentage of illiteracy as compared with the threefold percentage of the Slavs. The most direct menace to Italy has, throughout history, always come from Dalmatia and its contiguous regions, *i.e.* by barbaric hordes, coastal pirates, Turks, and Slavs. Rome and Venice were always most powerful and secure when they possessed Dalmatia, and, *vice versa*, Dalmatia was always rich and prosperous only when she was under Roman or Venetian dominion. The mountain barrier of the Dinarides isolates Dalmatia from Bosnia and Herzegovina: so much so that, as an economic and commercial hinterland, they are negligible factors. Dalmatia's present and future interests are therefore almost exclusively maritime, and as such her future lies in her close connection with Italy. Dalmatia is as necessary to Italy as Italy is to Dalmatia. To possess Dalmatia is to command the Adriatic. This command is vital to Italy for the defence and security of her exposed eastern coast. Hence Italy's claim not merely to an infinitesimal portion as a naval base, but to the whole of Dalmatia up to her natural inland frontier.

On the other hand, Signor Prezzolini, from his point of view, urges that the occupation of Dalmatia by Italy would be a source, not of

[1] Prof. Dainelli suggests that the electoral districts were arranged to the advantage of the Slavs and to the detriment of the Italians. There is no evidence of this; but even if there was, it would unfortunately not affect or invalidate the aggregate figures.

strength, but of weakness. Bosnia and Herzegovina constitute the natural and legitimate hinterland of Dalmatia, and effectual communication between the coast and that hinterland is, as experience has shown, only a question of railways which economically remove the mountain barrier. To take Spalato would alienate the Croats, to take Cattaro would make enemies of the Serbs. The Venetians only took Dalmatia to protect their trade against Dalmatian pirates, to procure timber for shipbuilding, and mariners for their fleet. When Dalmatia was decimated by wars and malaria, the Venetians did not re-people her with Italians, of whom they were jealous, but with Croats, Serbs, Albanians, and even Greeks and Turks. In Dalmatia Venice did not foster Italian, but only her own interests. Napoleon took Dalmatia not only for herself, but as a stepping-stone to the dominion of the Balkans. Napoleon and Austria, with all their political faults, did more for economic progress in Dalmatia than the Venetian Republic. Italian is spoken bi-lingually in Dalmatia only by the more educated Slavs, not as their mother-tongue, but only in their intercourse with Italians and other Mediterranean races. The vast majority of the population speaks and understands only Slav, and is purely Slav, even in dress. The command of the Adriatic belongs, not to those who occupy Dalmatia, but to those who dominate her coast. Italy should therefore be content to claim at most only the town of Zara as the indisputable seat and citadel of Italian culture on the littoral, and the island of Lissa as the most advanced outpost on the Dalmatian coast. Pola in Istria, Lissa in Dalmatia, and Valona in Albania would then secure the Italian command of the Adriatic; but the most effectual solution would be to eliminate all rivalry between Slavs and Italians by declaring the Adriatic a neutral sea. The occupation of Dalmatia by Italy would be an act of imperialism and can never be the outcome of a national war.

Dr. Radić, in the Preface to his French translation of Signor Prezzolini's book, hails the latter as a patriotic and masterly effort to ensure mutual friendship between the two races, albeit he evidently objects to Italian occupation in any form, even though it be limited to Zara and Lissa.

In face of the diametrically opposite views of the two Italian authors, it would be presumptuous to analyse their conflicting arguments, which must stand on their own merits. No impartial visitor to Dalmatia can fail to be struck with the deep impress of Italian culture in art, architecture, education, and refinement under the influence and ægis of the Italian language, to whose superior attractions all along the coast, as compared with other Mediterranean idioms, the official Austrian records do unstinted justice. For the rest, more especially as regards the racial and political problem of Dalmatia, the facts and figures speak themselves. All well-wishers of Italy and sympathisers with her aspirations must fervently hope that her traditions, culture, and commerce in Dalmatia will, by their inherent vitality, continue to hold their own, and that she will vindicate her legitimate position and influence in the Adriatic without the risk of coming into conflict with

As already stated, Prof. Dainelli's book is finely illustrated, and two of the illustrations are reproduced in the present article.

NOTE.—The foregoing was written before the signing of the Austrian Armistice. Pending the final solution of the Dalmatian problem at the Peace Congress, the terms of the Armistice as regards Dalmatia are explained in the general article which appears on pp. 441-48.

APPENDIX.

TABLES.

The Composition and Distribution of Population in Dalmatia.

TABLE I.—*Population* 1910.

Croats, . .	505,000	78 per cent.
Serbs, . .	105,000	16 ,,
Slavs, .	610,000	94 ,,
Italians, .	18,000	3 ,,
Austro-Germans,	3,000	0·5 ,,
Other nationalities,	3,000	0·5 ,,
Non-residents,	11,000	2 ,,
	646,000	100

TABLE II.—*Increase of Population, 1880 to 1910.*

1880, . .	477,000	
1890, . .	527,000	11 per cent.
1900, . .	594,000	12 ,,
1910, . .	646,000	9 ,,

Mean 10 per cent. per decade.

TABLE III.—*Comparative Population.*

	Slavs.	Italian.	Italian per cent.
1880, .	440,000	27,000	5·8
1890, .	501,000	16,000	3·1
1900, .	565,000	15,000	2·6
1910, .	610,000	18,000	3·0
	Increase.	Decrease.	
	170,000	9000	
	40 per cent.	33 per cent.	

TABLE IV.—*Distribution of Population* 1910.

6 towns 4000 to 13,000 population, . .	50,000	
9 towns 2000 to 4000 population, . .	25,000	
Smaller towns and villages, . . .	325,000	
	400,000	62 p.c.
Scattered population,	246,000	38 p.c.
	646,000	

TABLE V.—*Distribution of Religion and Languages.*

Roman Catholics—			
Croats, .	505,000	78	p. cent.
Italians, .	18,000	3	,,
Austro-Germans,	2,000	0·3	,,
Other nationalities and non-residents,	14,000	2·2	,,
	539,000	83·5	,,
Eastern Orthodox—			
Serbs, .	105,000	16	,,
Protestants—			
Austro-Germans, etc., . .	1000	0·25	,,
Jews — Various nationalities, .	500	0·25	,,
Other denominations, . .	500		
	646,000	100	

TABLE VI.—*Illiteracy above age of* 10, 1890 *to* 1910.

	Total population.	Illiterate.	Per cent.
1890,	527,000	437,000	83
1900,	594,000	433,000	73
1910,	646,000	393,000	63

Comparative Illiteracy, 1910.

	Total population.†	Illiterate.	Per cent.
1910, Slavs,	610,000	390,000	64
Italians,	18,000	3,000	17

THE VIRGIN ISLANDS OF THE UNITED STATES.[1]

(*With Illustration.*)

AMIDST the turmoil of war the actual transfer of the Danish possessions in the West Indies to the United States of America has almost escaped the attention of a distracted Europe. It had long been contemplated, and a treaty was made fifty years ago (in 1867), under which the islands of St. Thomas, St. Croix, and St. John were to change hands, the price agreed upon being 7,500,000 dollars. A royal proclamation was published by King Christian IX. in which the inhabitants were told that the islands had been ceded to America: but this treaty was pigeonholed, owing to internal dissension in the American Senate, and the King announced in a dignified proclamation, dated May 1870, that the sale had fallen through. After the Spanish-American war negotiations were renewed between the two countries, and a fresh treaty was made in 1902, which the Danish Upper House, in their turn, did not ratify, owing partly, it is thought, to the influence of Germany. Finally, in January 1917, the islands became the property of the United States, the purchase price being 22,500,000 dollars, and the formal transfer took place in the following March. If war conditions robbed the ceremony of pomp and circumstance, its significance cannot be overlooked. The attitude of the inhabitants, if not exactly enthusiastic, was benevolent, for their main outlet of trade had long been with America. Thus came about the passing of Denmark as a colonial power, an epoch in history, and an end to the struggles of the Danes for possessions in the West Indies during the seventeenth and eighteenth centuries, when, to use a phrase of Dr. Westergaard's, "Sugar was King." The rule of the Danes had, on the whole, been mild and paternal; that is, if we except the period during which Draconian laws were thought needful for the treatment of the African slave population at a time when the fear of risings and a massacre of the whites was constantly in the minds of the planters.

[1] (1) *The Danish West Indies*, by Waldemar Westergaard. New York: The Macmillan Company, 1918. Price $2.50.

(2) *The Virgin Islands of the United States of America*, by Luther K. Zabriskie. New York and London: G. P. Putnam's Sons, 1918. Price 20s.

(3) *The Virgin Islands, our New Possessions, and the British Islands*, by Theodoor De Booy and John T. Faris. Philadelphia and London: J. B. Lippincott Company, 1918. Price 12s. 6d. net.

Such risings were frequent, and the history of the islands, as told in the volumes before us, shows how real and terrible this danger was. It must be admitted that the harsh and cruel treatment meted out to the slaves by their white masters was enough to lead to reprisals.

Porto Rico is already under the Stars and Stripes, and a glance at the map will show the importance of St. Thomas, with its excellent harbour, to the United States to-day. It has been said that St. Thomas is "on the road to everywhere," and the opening of the Panama Canal has enormously enhanced the value of its possession to America in time of war as an outpost on the Caribbean Sea. It has also been pointed out that part of the Dutch West Indies—chiefly the Curaçao group—would form a valuable naval station for the protection of the entrance to the canal in the southern portion of the Caribbean.

The trilogyof books on the subject of the quondam Danish West Indies which are before us furnish a mine of useful and interesting information, and they will be found of great value for reference at this time. The bibliography of the islands is fairly large, but, as Dr. Westergaard (who is the son of a Danish family in North Dakota, and is Assistant Professor of History in Pomona College, California) shows us, the best repository of information is in the Danish State Archives in Copenhagen. A year's research amongst these documents on the spot has enabled Dr. Westergaard to provide much first-hand matter concerning the early days of the Danish colonies. His book is mainly historical, and treats of the time from 1671 to 1754, when the islands were under the rule of the Danish West India and Guinea Company.

The work of Mr. Zabriskie, formerly American Vice-Consul at St. Thomas, is partly historical and partly statistical; while Messrs. De Booy and Faris give an interesting description of the islands, with their scenery and social conditions, and of the attractions which they have for travellers and seekers after health. It is not possible to deal with these three books here in detail, but they all exhibit signs of much honest and painstaking work, combined with literary skill, and we can but direct the attention of the reader to them.

The islands are supposed to have been discovered by Columbus in 1493, and are included by him in the Virgin Group, which he named after St. Ursula and her virgins. Besides St. Thomas, St. Croix, and St. John, which are now American, the group comprises Tortola, Virgin Gorda, and Anegada, which are British, and a host of smaller cays. Spain was the first to claim possession, but history is silent during most of the sixteenth and seventeenth centuries, and in the days of Sir Francis Drake the islands were supposed to be uninhabited. Recent search amongst the kitchen middens, which are plentiful, shows traces of the aboriginal peoples, in the shape of pottery, ornaments, and burial places. These peoples were Indians who were probably kidnapped by the Spaniards for work in the mines of Hispaniola, or else exterminated. In addition to the remains referred to above, a number of curious carvings are found on the rocks, mostly rude representations of human heads and faces, which are no doubt the work of the Indians. The population to-day, apart from the Europeans, is descended from the slaves

Islands adjacent to St. Thomas Harbour. (From *The Virgin Islands of the United States of North America*, by Luther K. Zabriskie.)

imported from the Guinea coast, or other negroes who have come from adjoining islands in later times. The language used is mainly English.

Slavery was abolished by Denmark in 1847, and, with free labour, began the decline of the staple industry in sugar, which was hastened in later years by the discovery of beet-sugar, and the consequent fall in values. The production of cane-sugar was rapidly reduced, and the islands are now studded over with abandoned estates and the ruins of the houses of planters who, in the slave-owning days, had lived the luxurious and hospitable lives which were common to the West Indian Islands in the time of their prosperity. Since 1914 there has been a revival of sugar-planting, and, although the palmy days are gone, a considerable trade is carried on in sugar and other produce, which creates employment for labour and for shipping.

Dr. Westergaard's book deals in an exhaustive fashion with the history of the slave-trade, and he has much to tell of the relations which existed in former days between the slave and the planter, all of which is curious and interesting. It is worthy of note that the Elector of Brandenburg, Frederick William I. (father of Frederick the Great), established a company for trade in slaves, and that about 1680 the Brandenburg-Africa Company founded factories on the Guinea coast and in St. Thomas for the purpose of procuring and disposing of their human cargoes, thus following the example set by the English, French, Dutch, and Danes. This Prussian company existed until about 1718, when its charter expired, and it came to an inglorious end.

Up to the time of the outbreak of the war the German flag was predominant in the harbour of St. Thomas. The Hamburg-America Company has expended much capital in building wharves, coal depots, and offices, and Mr. Zabriskie notes that the German steamers received by this company at St. Thomas in 1913 numbered 177. British and American vessels now divide the carrying trade with Danish ships.

The three books are copiously illustrated with photographs, one of which we reproduce here, which serve to give an idea of the natural beauties of the islands and the attractions they have to offer to visitors. Living at St. Thomas and St. Croix is said to be good and cheap, but St. John, which Mr. De Booy calls the Cinderella of the Virgin Islands, still awaits development. It seems likely that under American rule the three islands will have a prosperous future. J. D. M.

Erratum.—On p. 408 of Colonel A. C. Yate's "Travel Memories" in the last issue, the word "India," six lines from bottom, should be Persia.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

Meeting of Council.

A Meeting of Council was held on the 14th of November, when the under-mentioned ladies and gentlemen were elected Members of the Society :—

Ordinary Members.

J. Inglis Ker, J.P., F.S.A.(Scot.).
Robert M. Neilson, M.I.M.E.
Miss Janet Miller.
Professor P. Hume Brown, M.A., LL.D.
Charles S. Du Riche Preller, M.A., Ph.D.
Mrs. Green-Thompson.
Henry H. Kerr.
James A. Stevenson.
Alfred P. Cumming.
David Callender, Esq., C.A.
Charles E. Green, F.R.S.E.
Miss M. E. M'Callum.
Mrs. Catherine Ewing.
Miss G. M. Scott.
E. H. Bramah.
Mrs. Ralph Richardson.
Mrs. James Currie.
Miss Julia Beith.
George S. Robinson

Associate Members.

Miss E. Edmunds.
Miss E. M. Walters, F.R.G.S.
Miss Edith Inglis, B.A.
Miss Jean A. Hardy, M.A.
Miss Mary Fraser.
Miss E. M. Gorrie, M.A.
Miss Marjory M. Brown.
Miss Mary F. Brown.
Miss Robina Menzies.
Miss Georgina Knox.
Mrs. Mary G. Smith.
Miss E. G. Currie.
Miss Ella S. Crowe.
Miss M. N. Kedley.
Miss Jeanie Graham.
Miss Eliza Henderson.
Miss Jessie E. Greig.
Miss Ethel Maconochie.
Miss Isabella Houston.
Miss Isabella M'Innes.
Professor B. C. Bhattacharya, M.A., M.R.A.S.

The Diploma of Fellowship was conferred upon Mrs. S. Green-Thompson, who has travelled extensively in different parts of the world, and Mr. Michael C. Andrews, whose elaborate researches into the early maps of Scotland and the medieval *Mappæ Mundi* had been placed at the disposal of the Society for publication.

The Annual Business Meeting.

The Annual Business Meeting was held on 14th November, the Hon. Lord Guthrie, LL.D., President of the Society, in the chair.

The Thirty-fourth Annual Report of the Council, which appears on pp. 476-80, was read by the Secretary, who also submitted to the meeting the list of office-bearers recommended by the Council for election for the current session ; and on the motion of Mr. William Lee, seconded by Mr. Clendinnen, the Report was adopted, and the office-bearers, as recommended, were unanimously elected.

The Hon. Lord Guthrie, LL.D., was re-elected President of the Society, and Colonel Sir Duncan A. Johnston, R.E., K.C.M.G., C.B., Chairman of Council. Mr. John Mathieson, F.R.S.G.S., was elected Honorary Map-curator.

The following members of Council who retired by rotation were re-elected:—Dr. William S. Bruce, F.R.S.E., Mr. H. M. Cadell, Mr. Lionel Hinxman, Dr. D. F. Lowe, Mr. T. S. Muir, F.R.S.G.S., and Colonel Wardlaw Ramsay as Edinburgh representatives; Dr. Robert Fullerton and Dr. James MacLehose, as Glasgow representatives; Mr. A. B. Gilroy as Dundee representative, and Major W. H. Coltman as representative for Aberdeen. Vacancies in the Council were filled by the election of Major-General P. C. Dalmahoy, Mr. John Harrison, C.B.E., and Mr. W. B. Wilson (*Edinburgh*), Dr. W. C. Black and Dr. Ebenezer Duncan (*Glasgow*), and Mr. W. Hunter (*Dundee*).

Dr. Robert S. Allan, Mr. J. C. Buist, and the Very Reverend Sir George Adam Smith were re-elected Chairmen of the Glasgow, Dundee, and Aberdeen centres respectively.

Lord Guthrie, in the course of a short address, drew the attention of the members to the exhibit of old maps of Scotland, at present on view in the Rooms, and also to the collection of maps of the war areas. He also spoke of the revived interest in geography due to the war, and stated that he looked forward with much confidence to the future of the Society.

GEOGRAPHICAL NOTES.

Europe.

Unknown Maps of Scotland.—Mr. Harry Inglis sends us the following:—"One of the most interesting features in connection with the wide publicity that has been given to the forming of the Scottish National Collection has been the discovery of a Map of Scotland hitherto unknown. This is an Italian Map, undated, but apparently issued between 1560 and 1570, and based evidently on a still earlier map, presenting the chief features in Bishop Lesley's map. Through the great generosity of Mr. Michael Andrews, F.R.S.G.S., Belfast, this unique map (the only known copy) has been presented to the Royal Scottish Geographical Society. Mr. Andrews has also presented a Photo-print of the Map of Scotland in the French Edition of Bishop Lesley's book. The Society has now, therefore, the most complete collection of all the early Maps of Scotland yet made, and these are now on view in the Rooms.

"Included amongst the maps presented by Dr. Blaikie is a Map of Scotland by Barbie de Bocage, about which nothing is known, as no Map of Scotland by him is mentioned in the list of that geographer's works. If any member can furnish a clue to the origin of this map, which gives a picture of Craig Phaderick, near Inverness, the Custodian of the Collection will be much obliged if a communication to that

effect is sent to him. The map appears to have been issued about 1800."

Albania: a Suggested New Frontier.—In the *Geographical Journal* for July last there appears a paper on the future of Albania, which was read before the Royal Geographical Society by Captain J. S. Barnes last spring. The paper gives a detailed description of a proposed new and enlarged frontier, the author supporting very strongly Albania's claims to form a separate nation. This frontier differs from that laid down in 1913 in several ways, notably in an extension to the east and north in the region north of Kalkandelen and to the east to the south of Gostivar, the latter extension bringing the whole of Lake Okhrida, with the towns of Struga and Okhrida into Albanian territory. The extensions are at the expense both of Serbia and of Montenegro. Further, the area lying between the lake of Scutari and the sea, now belonging of Montenegro, is assigned to the new state of Albania, the frontier proposed being drawn just south of Cape Berit. Captain Barnes further proposes that the state as roughly outlined above should be provided with a prince, and placed under the protection of Italy for a definite period. As will be realised, the suggestions made are drastic and are bound to arouse much criticism; some of the more obvious points were noted by the President of the Society in the discussion which followed the paper.

Alsace-Lorraine.—Professor Lucien Gallois, of Paris, contributes to the *Geographical Review* for August last an article on this subject which, though largely based upon Vidal de la Blache's book, contains some fresh facts and deductions. It is illustrated by some fine photographs and by a clear, though small-scale map, showing mineral resources and territorial changes. In addition to summarising the geography of the region, the article discusses the rise of German industry, and, correlated with it, of German imperialism, and considers the importance of the Alsace-Lorraine problem for Europe generally. Under the latter heading the relations of the Rhine canal system to the Seine, Rhone, and Danube are considered.

The Peoples of Austria.—In view of present conditions, attention may be usefully directed to an article on this subject by Mr. B. C. Wallis, which appears in the June issue of the *Geographical Review*. The article is illustrated by a striking series of maps, and is especially important in the light which it throws upon the distribution and characters of the Austrian Germans, and their probable fate in the future. The conditions suggest the possibility that, sooner or later, German Austria will become attached to South Germany. Among the special points brought out are the high rate of illegitimacy, and the relatively high infantile death-rate among the German Austrians, and their relative inferiority as cultivators, not only to the Czechs, but also to the Poles and Ruthenians. Further, Mr. Wallis brings out the fact that the industrialisation of Austria is due more to the Czechs than to the Germans, and indicates that the establishment of stable national States

within Austria-Hungary would reduce the German element largely to a people of foresters and herdsmen, whose natural development would be along Swiss lines. He raises also the question of the possible future of Vienna in a remodelled Austria, and suggests that it might conceivably decline to the level of Berne.

Asia.

North Syria and the Development of Mesopotamia.—To a recent issue of the *Near East* Mr. V. L. Trumper contributes an interesting article on the position, history, and economic possibilities of Northern Syria, and on a suggested railway from Alexandretta to Mosul and Baghdad. He points out, in the first place, that for Britain the sea-way to India by the Suez Canal must always possess higher strategic importance than a Levant-Basra route, despite the shortening of the distance by the latter. This is, of course, due to the fact that the former is more easily protected by sea-power. The question of the commercial importance of a railway direct from the Mediterranean shore to the Euphrates valley, however, is quite a different matter, and it is this subject which he discusses. He gives, in the first place, a somewhat strikingly-worded account of the geographical relations between Syria and Palestine, as the highway to Egypt, and Mesopotamia, in connection with the intervening desert area. The latter he describes as a right-angled triangle, the base of which runs due east from Maan on the Hedjaz railway, while the perpendicular runs nearly north from the same place, passing east of Amman, the triangle being completed by the right bank of the Euphrates valley. The shape of the desert area may, he points out, be also realised by noting that while Maan and Basra, which are practically in the same latitude, are distant from one another by about seven hundred miles, only fifty miles separate Aleppo from the nearest point of the Euphrates valley. This desert region has always forced traffic from Mesopotamia to Egypt to pass through North Syria, while, similarly, traffic from Mesopotamia to the Mediterranean must come through the same area. The author adds some interesting historical notes before passing on to summarise the natural wealth of North Syria. Antimony, coal, and manganese occur, and once at least there was iron; timber is abundant, and is in great demand alike in Mesopotamia and Egypt. The valleys grow all kinds of grain, fruit, cotton, and tobacco, and wool, leather, and silk are produced. Any future development of Mesopotamia must depend upon easy access to the Mediterranean, and the engineering difficulties in the way of a direct railway route through North Syria are insignificant. The distance from the mouth of the Orontes to the Euphrates is only 130 miles, and of this only 40 miles lie at a height of over 1000 feet above sea-level. By the present route the distances from London to Baghdad or Mosul are as follows:—London to Basra (sea) 6700 miles, Basra to Baghdad (rail) 300 miles, Basra to Mosul 500 miles. A railway from Antioch or Alexandretta to Mosul or Baghdad would give the following:—London to Alexandretta (sea) 3400 miles, Alexandretta to Mosul (rail) 400

miles, Alexandretta to Baghdad 500 miles. The great saving would thus be on sea transport, and in the Suez Canal dues, the railway journey not showing any very great differences.

America.

The Nomenclature of the United States.—One minor consequence of the entry of the United States into world politics has been the rise of a feeling, both within and without, that a concise name for the country, and, especially, an adjective derived from the cumbrous title of "United States of North America" which would be free from the objections of "American" is much to be desired. This feeling has found expression in correspondence in the periodical *Science* as well as elsewhere. One contributor states that the abbreviation U.S.A. is inaccurate, for it is the official designation of the United States Army, as U.S.N. is that of the United States Navy. He suggests that postage stamps should bear the letters U.S.O.N.A., and that the words Usona and Usonian should be derived from it as noun and adjective respectively. Another correspondent points out that while the customary use of "America" for the United States has the same basis as that of "Mexico" for the United States of Mexico, or "Brazil" for that of the United States of Brazil, it is unjustifiable, and the other abbreviation, commonly used in Canada, of "the States," is utterly meaningless.

It may be noted also that the rise of Canada—to say nothing of the existence of Mexico—makes the use of North America as an abbreviation for the United States of North America impossible, so that a new title seems necessary for the "country without a name."

General.

Obituary: Admiral Sir A. H. Markham.—We regret to record the death of this distinguished explorer and writer, which took place in London on October 28. Admiral Markham, who had nearly completed his seventy-seventh year, is best known for the part he took in the Nares' Arctic Expedition of 1875-6. The Government, it will be recollected, fitted out the *Alert* and the *Discovery* for Arctic exploration in 1875, and Markham was second in command, under Sir George Nares, on the *Alert*. He was selected to lead the Polar sledging party in 1876, and left winter quarters on the coast of Grant Land, in 82° 28′ N., on April 3, 1876. No dogs were employed, and the men had to pull the sledges over the ice. The condition of the ice, and an outbreak of scurvy, made it necessary to turn back on May 13, when a latitude of 83° 20′ 28″ had been reached. This was surpassed by a few miles by the Greely expedition of 1881-4, but except for this constituted the record till Nansen's expedition of 1893-6.

In later years Admiral Markham undertook other pieces of northern exploration, notably in his trip to Novaya Zemlya in 1879, and to the Hudson Bay region in 1886. In addition to books describing his own travels, he was the author of various biographies of Arctic explorers, the last of the series being that of his cousin, Sir Clements Markham (1917).

Economic Geography.

Development of the Sudan.—An article in the *Near East* for July 26 discusses railway projects in the Sudan, and emphasises the necessity for carrying out an irrigation scheme in the country before expensive railway lines are built. The railways must have traffic before they can pay, and without irrigation the productivity of the land depends entirely upon the uncertain quantity of the rains. During the war the existing railways have done well, but this is largely because of the heavy rains, which have made it possible to export grain for military requirements. Four years ago the rains were so bad that dhurra had to be imported from India by the Government to feed the starving population. On the other hand, in 1917 nearly 100,000 tons of dhurra were sent from the country to Halfa and the Red Sea. A satisfactory irrigation scheme would not only ensure the population against starvation, but would enable them to continue to export grain even in dry years.

NEW BOOKS.

EUROPE.

La Dobrogea (Dobroudja): Essai Historique, Économique, Ethnographique et Politique. Par N. P. Comnène. Paris: Payot et Cie., 1918. *Prix* 3 *frs.*

This book, which is illustrated by ten interesting ethnographical maps in colours, is definitively propagandist in aim, its purpose being to plead Rumania's claims to the region under discussion. She was, it will be remembered, deprived of territory here by the Central Powers at the time when she was forced to make peace. The author defines the Dobruja as the area between the Danube, the Black Sea, and a line running from Silistria to the vicinity of Mangalia,—that is, roughly, the territory assigned to Rumania at the treaty of Berlin in compensation for the loss of Bessarabia. To the further area comprised between the 1878 frontier and a line connecting the towns of Rustchuk, Shumla, and Varna, he gives the name of the Dobruja quadrilateral. The latter includes, of course, a part of the territory assigned to Rumania by the treaty of Bukarest in 1913. But the question whether the author's claim, on behalf of Rumania, is to the 1913 frontier or only to that of 1878 is not definitely discussed.

The question of the ethnographical composition of the population of the Dobruja is discussed in much detail, and, as already indicated, with the help of a fine series of maps. The discussion shows clearly that there have been great changes since 1878, for the treaty of Berlin was followed by a considerable emigration of Turco-Tatar elements, who had previously been in the majority. At the same time there has been a steady increase in the number both of Rumanians and of Bulgars. The former, however, predominate greatly over the latter, and constitute more than half of the total of the very mixed population. The figures given for 1913 are over 200,000 Rumanians out of a total population of 380,430.

In his argument M. Comnène assigns prime importance to this fact, but adds that one must also take into account the sacrifices made by Rumania to acquire and preserve the region, the wealth and energy which have been devoted to its development, and its political and economic value for the Rumanian State. The whole discussion shows how much more complicated are these Balkan demarcation

questions than is always realised by those who would lightly put them to the touchstone of a particular formula, and the book should be read by all those desirous of appreciating, through the study of a particular case, the complexities of the most difficult problem which the civilised world has still to solve. We may add, for what it is worth, as the expression of a personal opinion, that there seems more hope in practical common sense and a willingness to compromise, than in an appeal to general principles, however idealistic may be the basis of these.

War and Revolution in Russia. By John Pollock. London: Constable and Co., 1918. *Price 6s. net.*

The "Sketches and Studies" contained in this volume have chiefly appeared in various British newspapers and magazines, and represent the author's impressions, after an extensive experience of Russia and its people, up to September 1917. Before the Revolution of the spring of that year, a Society was formed in Petrograd called "The Society of the Year 1914," whose aims were "to struggle against German influence, and for the regeneration of Russia." The Society was, the author says, "like almost every one in Russia, definitely republican and democratic," and "as the Court and the Government became more pro-German and reactionary, persons of all shades of political opinion found, under the Society's wide ensign, a platform on which they could work jointly for the salvation of their country." This was before Bolshevism had compassed the ruin of Russia.

The author tells us that, "from an early stage in the war, there has existed a strong pro-German element in the Russian Government, and much criminal negligence and actual treachery in high places." He continues: "In every rank of society it was freely said that the nation and the army were sold by the Empress's minions, and that she aimed at obtaining a Regency to replace an Emperor whose weakness, garrulousness, and drunkenness had become a by-word." We have read several criticisms of Nicholas II., but none alleged that he was a drunkard. Against the author's statement is to be placed the fact that it was by the late Tsar's command that the manufacture of vodka was prohibited during the war. The volume under notice, however, contains much of interest as seen by an eyewitness of the Russian Revolution, and many sketches of life in Russia, Poland, and Austria, which form agreeable and instructive reading.

ASIA.

Cyprus under British Rule. By Captain C. W. J. Orr, author of "The Making of Northern Nigeria." London: Robert Scott, 1918. *Price 6s. net.*

Politicians and publicists and students, particularly those interested in British Colonial Administration from the political rather than the commercial standpoint, are greatly indebted to Captain Orr for the up-to-date documents and information here brought together. The author writes with all the advantage of his official position in Cyprus itself, viz. that of Chief Secretary to the High Commissioner. What his political standpoint is we may gather from the closing sentences of the preface. "We [British] are fond," the writer says, "of representing ourselves as champions of small nationalities and peoples, and we boast of our hatred of injustice, oppression, and illiberality in any form. It behoves us, therefore, to take especial care that in our relations with our dependencies, our attitude and our actions should be above reproach, and that we have nothing on our conscience for which we can be justly condemned in the eyes of civilisation." These sentiments themselves are beyond dispute, but if they are to be read as suggesting an unfavourable verdict upon British administration in Cyprus, then the writer

answers himself in the chapters of his book. Most readers also will claim liberty to smile incredulously when the author elsewhere asks, "Is it possible to doubt that if Cyprus had remained in Turkish hands, public opinion would have forced the Porte to provide a more liberal administration?" Be it acknowledged, however, that such sentiments are more prominent in the opening political chapters than in the later chapters, which deal with education, agriculture, forests, and communications. All the same, in these days when the absolute selfishness and brutality of the German and Turkish government of dependencies are being brought home to us, one feels that the benefits and the righteousness of British administration might well have had more hearty acknowledgment. May one be permitted to imagine that the Chief Secretary was unwilling even to seem to praise himself?

From a number of separate pages we cull striking facts like the following :—

Before 1878, when Britain took over the administration of Cyprus from the Turks, eighty per cent. of the income raised from taxes was sent to Constantinople. Three out of four of the population (in 1911, four out of five) were Christian, but the Turkish Government grants for education, such as they were, were confined to Moslem schools. In 1878 there were 26 miles of roads in the island and no harbour; there are now 800 miles of first-class roads and over 1000 miles of secondary roads, all fit for wheeled traffic; over 2000 bridges and culverts have been constructed; there are 60 miles of railway and several piers. In 1878 the island was rapidly becoming deforested, and was consequently on the way to becoming a dry, bare, unproductive region; in the year 1917-18, the Forest Department of the Government spent over £35,000.

It is very interesting to gather from Captain Orr's volume how similar the political problems of one region often are to those of other regions. Is there any training in political philosophy, one wonders, for the government administrators and civil servants, or does the soldier administrator simply develop in course of time into the civil administrator? A single instance of the similarity may be noted. In Cyprus the rival interests of Cypriote Hellenes and Cypriote Moslems produce precisely the same problems of government as do the heterogeneous populations of India, of Ireland, of the Cape, and justify the generalisation that such non-homogeneous populations cannot be organised as separate political entities upon ideal democratic lines. The book is not provided with any detailed map of Cyprus nor are the geographical dimensions of the island anywhere stated. But again, for the up-to-date information, the special student of Cyprus or the colonies generally is greatly indebted to its author.

AMERICA.

Over Here: Impressions of America by a British Officer. By Hector MacQuarrie, B.A. (Cantab.), Second Lieutenant, Royal Field Artillery. Philadelphia and London: J. B. Lippincott and Co., 1918. *Price* 6*s. net.*

The author of this book, after being invalided from Ypres, was sent to America, apparently in the summer of 1916, though there is some confusion as to dates in the book, as an inspector of production. After the entry of the States into the war, we gather, he began to lecture through the country on behalf of the U.S. Bureau of Public Information. The book gives a lively account of his experiences in both capacities during his year's visit. He went, in the first instance, to the steel town of Bethlehem, which was his headquarters for some time, but visited many other parts of Pennsylvania, and also travelled north through Detroit to Canada. The main object of the book is to help "to cement a strong, intelligent

friendship" between the States and this country, and the author's warm admiration for the American people stands out conspicuously throughout. There is not much of direct geographical interest, but the descriptions of the various towns, notably of Bethlehem and of Atlantic City, are vivid and entertaining, and the author's enthusiasm, vivacity, and willingness to be pleased make his chapters pleasant reading.

GENERAL.

Frontiers: A Study in Political Geography. By C. B. Fawcett, B.Litt., Oxford; M.Sc., London. Oxford: At the Clarendon Press, 1918. *Price* 3*s. net.*

This little book of 103 pages is a real contribution to the study of an all-important subject which is now only beginning to be considered seriously and scientifically. The latter phrase is justified by the fact that the author thinks it necessary—and it *is* necessary—to begin with definitions of certain terms. We have learned not to expect much in the way of precision of language from the average newspaper writer, but when such authorities as Lord Curzon and Professor Lyde use the words "frontier" and "boundary" indiscriminately, it is time for something to be done. Geography cannot aspire to be a science until it acquires a reasonably exact terminology. As has already been pointed out in these pages by Mr. Chisholm and others, the chief difficulty is that most of the terms used in geography are already ordinary English words with a meaning of their own, and it is scarcely permissible to coin new words except for new things. The discovery of a gas or a mineral calls for the word-maker. But the great facts and general principles of geography have been known for centuries. Mr. Fawcett agrees with Miss Semple and Sir T. H. Holdich in defining "frontier" as an area, and "boundary" as a line.

The book consists of nine chapters, of which the first is a general introductory sketch, emphasising the fact that mankind is divided into groups of relatively dense population separated from each other by areas which are more or less empty. The second chapter deals with the zonal character of frontiers. In nature there are no hard-and-fast lines of separation. "Wallace's Line" is a belt. "Frontiers are transition areas" (p. 24). The functions of the frontier are discussed in the third chapter, and for this purpose the author classifies them as "zones of separation" and "zones of intercourse." In other words, frontiers are mainly protective, but with civilised peoples at least they ought to permit of easy inter-communication. He considers this "a more accurate and useful representation of the facts than the ordinary classification into 'natural' and 'artificial' frontiers" (p. 32). All the same, however, he uses these convenient if somewhat slipshod terms in subsequent chapters. Indeed, we are inclined to go a little further, and to attempt to lay it down that all frontiers are "natural," and all boundaries are "artificial." Where the zone of contact between two peoples, as in the case of Alsace and Lorraine, is populous, it is the result of "natural" conditions. One must not confuse "natural" with "physical." When the author says—"who shall decide how small a boundary river or hill is at the point at which the frontier ceases to be a 'natural' one and becomes 'artificial'?" (p. 33)—he seems himself to be using frontier and boundary indiscriminately.

Chapter iv. gives an admirable summary of "Natural Barrier Frontiers." It contains nothing new but it is freshly put and the examples are numerous and well chosen. The whole of Chapter v. is devoted to "River Boundaries." Should not this be "river frontiers"? True, the author points out that there are few cases where even large rivers separate peoples. True also, that a river basin is a

geographical unit, that rivers unite and do not separate. But where a river does separate countries, as in the case of the lower Danube, is it not because with its northern fringe of marshes it *is* a frontier? Chapter VI. deals with "Artificial Boundaries." These were in early times either artificial wastes or actual barriers. In the nature of things these cannot be permanent although for a period they may be effective enough. Indeed, might one not say that the one essential characteristic of a boundary is its transitoriness? The classification given on p. 66 modified from Lord Curzon's, viz.—pure astronomical lines and lines of reference—contains the essence of impermanence. A line which ignores natural features, tribal or linguistic groupings, national wishes, and which, therefore, is a fruitful cause of disputes, and even wars, cannot be permanent. Even the date-line in the Pacific does not follow the 180th meridian, but zigzags about in order to avoid absurd anomalies. Have we not reached the stage, then, of stating that frontiers are permanent, boundaries are not?

The next chapter treats of "Frontier Marches and Buffer States." Here, in particular, the development of Prussia and Austria is admirably summarised. The natural sequence is "Strategic Frontiers," including zones and spheres of influence and interest, the Austro-Italian so-called "scientific" frontier, the north-western triple frontier of India, and even the "hands-off" Monroe doctrine of the United States. America has entered the present war, consciously or unconsciously, in order to defend this doctrine while there is yet time.

Dealing in the last chapter with the "Evolution of Frontiers," the author sets down three main trends of development (p. 92). "They are (1) a tendency towards precision of boundary lines, (2) a tendency towards the coincidence of political with linguistic and national boundaries, and (3) a tendency towards the placing of boundaries in those natural zones of separation which we have called Natural Barrier Frontiers." With this we thoroughly agree, but we should like to add that the three must stand or fall together. A boundary line, no matter how carefully it has been delimited in the council chamber, or how accurately demarcated on the ground, is worse than useless unless the other conditions have been scrupulously observed. It is just possible that in the long run the third principle may become of less importance than the second, although natural barriers can never lose their whole significance, but national aspirations is the main principle for which we and our allies are fighting, and it is a principle which rests upon the very foundation of modern geography.

We have dealt with the chief aspects of this excellent monograph, and considerations of space prevent us from enlarging further. We can only say in conclusion that the style is clear, the arrangement well considered, and the map-diagrams useful and illuminating.

EDUCATIONAL.

Essentials of Practical Geography. By B. C. Wallis, B.Sc.(Lond.), F.R.G.S. London: Macmillan and Co., Ltd., 1918. *Price* 4*s.* 6*d. net.*

Of late years there has been a tendency among many teachers to devote so much attention to so called practical work that the human side of geography has been apt to be neglected, with the result that a reaction has set in, and many teachers are inclined to assert that much of what passes for practical geography is, strictly speaking, not geography at all, but is only the science master's work transferred to the teacher of geography. Both parties will, however, agree that a satisfactory school course should include practical work which the pupils themselves may perform. This book should be appreciated by the busy geographical

teacher, whatever views he may take as to practical geography. We have here a collection of practical exercises on the essential principles usually included in the syllabus of geography, from which the teacher may select examples to suit his special schedule of work. Part I. contains exercises which cover the whole course of general geography: while Part II. contains supplementary exercises on geographical mathematics, physics, etc. Some useful observational and instrumental outdoor exercises are also added. The whole book provides a thorough training in geographical methods and principles, and is cordially recommended to the attention of all geography teachers.

BOOKS RECEIVED.

South America and the War. By F. A. KIRKPATRICK, M.A. With Map. Small royal 8vo. Pp. vii + 79. Cambridge: at the University Press, 1918. *Price* 4*s.* 6*d. net.*

Practical Geography Notebooks. British Empire. By THOMAS FRANKLIN and ERNEST R. SHEARMUR. Royal 8vo. Pp. 38. London: Macmillan and Co., 1918. *Price* 6*d. net.*

Switzerland. By C. F. CAMERON, B.A. With Maps and Illustrations. Crown 8vo. Pp. viii + 320. London: T. C. and E. C. Jack, Ltd., 1918. *Price* 5*s. net.*

Rome. By ELIZABETH O'NEILL, M.A. With Maps and Illustrations. Crown 8vo. Pp. ix + 333. London: T. C. and E. C. Jack, Ltd., 1918. *Price* 5*s. net.*

The Handbook of Uganda. Compiled by H. R. WALLIS, C.M.G. With Map and Illustrations. Demy 8vo. Pp. xix + 220. London: Crown Agents for the Colonies, 1918. *Price* 2*s.* 6*d. net.*

New Italy. By HELEN ZIMMERN and ANTONIO AGRESTI. Crown 8vo. Pp. xix + 274. London: Constable and Co., Ltd., 1918. *Price* 6*s. net.*

Scenes of Russian Life. By JOSEPHINE CALINA. Crown 8vo. Pp. 302. London: Constable and Co., Ltd., 1918. *Price* 6*s. net.*

Eastern Exploration: Past and Future. By W. M. FLINDERS PETRIE. Crown 8vo. Pp. 118. London: Constable and Co., Ltd., 1918. *Price* 2*s.* 6*d. net.*

La Péninsule Balkanique: Géographie Humaine. By JOVAN CVIJIĆ. With 40 Maps and Sketches. Medium 8vo. Pp. viii + 528. Paris: Armand Colin, 1918. *Price* 20 *frs.*

Seaways of the Empire. Notes on the Geography of Transport. By A. J. SARGENT, M.A. Crown 8vo. Pp. xv + 171. London: A. and C. Black, Ltd., 1918. *Price* 7*s.* 6*d. net.*

Crieff: Its Traditions and Characters. Crown 8vo. Pp. 304. Edinburgh: D. Macara, 1881. [*Presented by Dr. Keppie Paterson.*

Russia. Vols. I. and II. La Russie: ses possibilités économique. La Russie: un grand avenir commercial pour la France. London: R. Martens and Co. [*Presented by R. Richardson, Esq., W.S.*

From the Garden of Eden to the Crossing of the Jordan. By Sir WILLIAM WILLCOCKS, K.C.M.G. Cairo: Printed by the French Institute of Oriental Archæology. *Price* 5*s. net.*

Department of the (U.S.) Interior Reports. General information regarding Rocky Mountain National Park, Mesa Verde National Park, Crater Lake National Park, Glacier National Park, Yellowstone National Park, Yosemite National Park, Sequoia and General Grant National Parks, Mount Rainier National Park, Wind Cave National Park, The Hot Springs of Arkansas, The Casa Grande Ruin, Arizona. Washington, 1918.

Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions, 1917. Vol. I. London, 1918. *Price* 6*s. net.*

Colonial Reports—Annual. Ashanti 962.

Publishers forwarding books for review will greatly oblige by marking the* price *in clear figures, especially in the case of foreign books.

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

REPORT OF COUNCIL.

THIRTY-FOURTH SESSION, 1917-1918

(*1st October* 1917 *to 30th September* 1918).

The Council have the honour to submit the following Report:—

ORDINARY MEMBERSHIP.

The changes which occurred during the Session in the number of members were as follows:—

Number on 1st October 1917,		1367
New Members added,		28
		1395
Deduct by Death,	43	
„ Resignation,	46	
„ Arrears,	3	
	92	
Number of ordinary members remaining on the roll on 1st October 1918,		1303

Of this number, 677 are on the Edinburgh list, 318 on the Glasgow list, 113 and 85 on the Dundee and Aberdeen lists respectively. In addition to those on the lists named, 30 members reside abroad, and 80 reside in England. The number of Life members in the total given above is 191.

TEACHER ASSOCIATE MEMBERS.

Number on 1st October 1917,		148
New Members added,		15
		163
Deduct by Resignation,	11	
	11	
Remaining on roll 1st October 1918,		152

The numbers of Associate Members at the various centres are as follows:—Edinburgh, 60; Glasgow, 56; Dundee, 1; Aberdeen, 12. In addition 22 reside in England and 1 abroad.

FELLOWS AND HONORARY MEMBERS.

There are five Honorary Fellows and ninety Ordinary Fellows of the Society, and thirty-six Honorary, and forty-eight Honorary Corresponding Members.

The Diploma of Fellowship was granted during the session to Mr. William Mackay, Mr. Charles Matheson, M.A., and Mr. W. H. Menmuir, L.D.S.

Meetings of the Society.

Twenty-one ordinary meetings of the Society were held, five at each of the Edinburgh, Dundee, and Aberdeen centres, and six at the Glasgow centre. These meetings were addressed by Dr. C. M. Delgado de Carvalho, Mr. A. F. Whyte, M.P., Rev. John Kelman, D.D., Mr. S. G. Cheng, Sir Alfred Sharpe, K.C.M.G., C.B., and Caval. F. de Filippi.

There were also six afternoon lectures on subjects connected with the war delivered at Edinburgh. These lectures were open free to the public. The first was delivered in the Council-room of the Society, but the others were delivered, through the courtesy of the Royal Society of Edinburgh, in that Society's lecture hall. These lectures were addressed by Lieut. Mackie, Mr. E. P. Stebbing, Dr. Marion I. Newbigin, Mr. G. G. Chisholm, the Right Hon. Sir Wm. Macgregor, P.C., G.C.M.G., C.B., and Mr. Andrew Watt, M.A., Sec. Scot. Meteorological Society. At the conclusion of the last lecture, which was presided over by Dr. Horne, P.R.S.E., a cordial vote of thanks to the Council of the Royal Society of Edinburgh for their kindness in lending the hall was passed by the meeting.

Society's Medals.

No award was made either of the Society's or the Livingstone Gold Medal.

The Society's Silver Medal was awarded to Miss Joan M'Donald, M.A., the first in the merit list in the ordinary class in Geography in Edinburgh University.

Co-operation of the Society in the Training of Officers in His Majesty's Service.

As in previous years since the beginning of the war the Society's rooms were open during ordinary hours to the officers in H.M. service for the consultation of maps and other materials in the possession of the Society.

Association of Scottish Teachers of Geography.

Owing to the war this Association has been obliged to suspend its activities.

The Scottish Geographical Magazine.

Despite the difficulties due to the great rise in printing costs, the *Magazine* has continued to appear monthly throughout the year. As usual the lecturers visiting the Society have placed valuable material at the disposal of the editors, while certain new activities of the Society and its members have found expression in the pages of the *Magazine*. Thus the successful series of afternoon lectures arranged during last session resulted in the publication of several articles having a direct bearing on current problems. Again, the proposal to found a National Collection of Old Maps of Scotland in connection with the Society has already led to the publication of a series of articles by Mr. Harry Inglis, Hon. Custodian of this collection, and other articles of similar type, possibly illustrated by reproductions of some of the maps, will appear during the coming year. The fact that many members are engaged on active service abroad, also, has resulted in the publication of some interesting matter. Problems of reconstruction in the future have not been neglected, as witness Mr. Cadell's article on the Forth Estuary, illustrated by maps kindly provided by the author. In the Geographical Notes care has been taken to devote special attention to the problems now arising in the different war areas, in so far as those have geographical bearings.

The Council desire to acknowledge their obligations to the contributors of

articles, and to the following, who have rendered valuable assistance to the editors:—Dr. J. G. Bartholomew; Mr. H. M. Cadell; Mr. S. H. F. Capenny; Mr. G. G. Chisholm; Mr. John Clarke; Dr. John Gunn; Mr. L. Hinxman; Dr. Lee; Mr. A. Lee; Mr. John Mathieson; Mr. J. D. Monro; Rev. Dr. Morrison; Mr. T. S. Muir; Mr. C. T. Macgregor; Rev. R. Mackenzie; Mr. Ralph Richardson; Mrs. Stevenson; and Mr. W. B. Wilson.

The Library and Map Department.

During the past session 101 books, 22 pamphlets, 108 reports, 5 atlases, 152 map-sheets and charts have been added to the Library. The transactions and periodicals received regularly number 154. The number of volumes borrowed by members was 2120, and the library was, as usual, much consulted by others in search of geographical information.

The Council desire to record their thanks to Foreign and Colonial Governments for the official publications they have presented to the Library; to the Treasury, for the revised Ordnance Survey maps of Scotland, both in outline and colour, as each of the revisions now in progress is published; to the Geological Survey of Scotland; to the Geographical Section, General Staff, War Office; to the Admiralty; to the British Museum (Natural History); to the Edinburgh University Library; to the Survey of India; and also to the under-mentioned private donors of books and maps, viz.:—Right Hon. Lord Abercromby; Dr. C. M. Delgado de Carvalho; Mr. James Chumley; M. Guerra Guillermo; Mr. James Macalister; Professor F. Nöel; and Sir Aurel Stein.

National Collection of Old Maps of Scotland.

A Committee has been appointed for the formation of a complete collection of the old maps of Scotland, including all early atlases, county maps, charts, town plans, feuing and estate plans, and especially manuscript maps.

The present acting members of the Committee are the Hon. Lord Guthrie, LL.D., President R.S.G.S.; Prof. P. Hume Brown, LL.D., Historiographer Royal; J. G. Bartholomew, LL.D., Cartographer to the King; W. B. Blaikie, LL.D., Member of Council R.S.G.S., and Harry R. G. Inglis, Member of Council R.S.G.S., who has been appointed Hon. Custodian of the collection.

To this Committee the Council have handed over the care of all early maps already in the possession of the Society. The Committee have acquired by purchase the collection of old Scottish maps belonging to the late Mr. C. G. Cash, who for many years made a special study of the subject; and through the generosity of certain donors and certain fortuitous circumstances have been placed in such a position that they require only about half-a-dozen general maps to make the collection complete down to 1820, and they already have maps which do not appear in any of the public libraries of Scotland. The collection as it stands is absolutely unique, being more nearly complete than any yet gathered. So far the expenses of the Committee have been met by voluntary subscriptions, the amount of which on September 30, 1918, was £111.

Obituary.

The Council regret to have to record the death of Sir James A. Russell and Sir Philip Trotter, both for many years Members of Council; and of Prof. Paul Vidal de la Blache and Prof. G. K. Gilbert, Corresponding Members.

Finance.

The Annual Financial Statement here follows.

ABSTRACT OF THE ACCOUNTS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

From 30th September 1917 *to 30th September* 1918.

FUNDS AT 30TH SEPTEMBER 1917:—			
£400 Dominion of Canada 3½ per cent. Registered Stock, 1930-50 (Deposited with Treasury) cost,		£405	1 0
£1777. 7s. 7d.—5 War Stock 1929-47, cost,		1686	7 6
£100 — 4 Exchequer Bonds, due 1st April 1922,		100	0 0
		£2191	8 6
BALANCES due by Banks:—			
On Account Current,	£167 1 4		
On Deposit Receipt,	272 10 0		
On Do do. (Glasgow Equipment Fund)	61 16 9		
		504 11 1	
		£2695 19 7	
Less— Subscriptions received in advance	£6 6 0		
Entrance Fee do.	1 1 0		
Due to Treasurer,	8 4 3		
		15 11 3	
		£2680 8 4	
SUBSCRIPTIONS from Ordinary Members,	£1150 16 0		
Less— Paid in Advance,	11 11 0		
	£1139 5 0		
SUBSCRIPTIONS from Associate Members,	73 10 0		
DIPLOMA FEES,	14 14 0		
DIVIDENDS and INTERESTS,	120 19 0		
GOVERNMENT GRANT,	200 0 0		
INCOME TAX recovered for year ending 5th April 1918,	1 0 0		
ENTRANCE FEES from new Members, £22 11 6			
Less— Paid in Advance, 1 1 0			
	21 10 6		
		1573 18 6	
INTEREST ON DEPOSIT RECEIPT (Glasgow Equipment Fund),		6 18 4	
		£4261 5 2	

MAGAZINE—Expenses of Publication, etc., for Nos. 10 to 12 of Vol. XXXIII., and Nos. 1 to 9 of Vol. XXXIV.—			
Printing and other charges,		£692	15 5½
Illustrations,		24	5 7
Maps		10	0 0
		£727	1 0½
Less— Magazines sold, £81 5 15			
Advertising Receipts, 82 13 8			
	164 19 7		
		£562	1 5½
GENERAL PRINTING and STATIONERY,		58	9 10
BOOKS and other furnishings for Library,		24	11 3
EXPENSES in connection with Lectures—*Less* Lecture Tickets sold,		258	10 3
GLASGOW BRANCH, Rent of Room,		13	0 0
RENT OF COUNCIL ROOM, Taxes, Gas, Repairs, Insurance, etc.,		215	13 3
SALARIES,		506	8 8
MISCELLANEOUS, including General Expenses, and Postages,		58	15 8½
MEDALS,		1	11 0
		£1701	4 5
FUNDS AT 30TH SEPTEMBER 1918:—			
£400 Dominion of Canada 3½ per cent. Registered Stock, 1930-50 (Deposited with Treasury), cost,	£405 1 0		
£1777. 7s. 7d.—5 War Stock, 1929-47, cost,	1686 7 6		
£100—5 Exchequer Bonds due 1st April 1922,	100 0 0		
	£2191 8 6		
BALANCES due by Banks:—			
On Account Current, £299 5 0			
On Deposit Receipt, 22 10 0			
On do. do. (Glasg. Equipment Fund), 71 15 1			
	393 14 1		
	£2585 2 7		
Less— Subscriptions received in advance, £11 11 0			
Entrance Fee, Do 1 1 0			
Due to Treasurer, 12 9 10			
	25 1 10		
		2560 0 9	
		£4261 5 2	

Edinburgh, 21st October 1918.—I have examined the Accounts of the Royal Scottish Geographical Society for the year ended 30th September 1918, of which the above is an Abstract, and compared them with the Vouchers and Instructions thereof, and I find the whole to be correctly stated and sufficiently vouched and instructed.

P. C. ROBERTSON, M.A., C.A., Auditor.

LIVINGSTONE MEDAL FUND.

FUNDS AT 30TH SEPTEMBER 1917:—			
£572, 12s. 5d.—5% War Stock 1929-47, cost,		£543	19 10
Deposit Receipt Commercial Bank of Scotland, Limited,		99	9 2
		£643	9 0
Less—Balance due to Treasurer,		0	1 9
		£643	7 3
INCOME RECEIVED:—			
Interest on £572, 12s. 5d., 5% War Stock 1929-47 untaxed,	£28 12 8		
Bank Interest,	3 8 4		
		32	1 6
		£675	8 3

FUNDS AT 30TH SEPTEMBER 1918:—			
£572, 12s. 5d.—5% War Stock 1929-47, cost,		£543	19 1
Deposit Receipt Commercial Bank of Scotland, Ltd.,		131	8 5
		£675	8 3

Edinburgh, 21*st October* 1918.—Examined and found correct.

P. C. ROBERTSON, M.A., C.A., Auditor.

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